



THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION

VOLUME 3 NUMBER 3 WINTER 2010

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ABOUT *THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION*

The International Journal of Organizational Innovation (IJOI) (ISSN 1943-1813) is an international, blind, peer-reviewed journal, published online quarterly . It may be viewed online for free. It contains a wide variety of research, scholarship, educational and practitioner perspectives on organizational innovation-related themes and topics. It aims to provide a global perspective on organizational innovation of benefit to scholars, educators, students, practitioners, policy-makers and consultants.

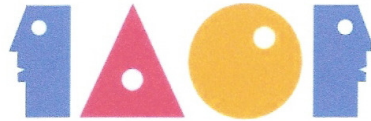
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MANAGEMENT CONSULTING: A PROFESSIONAL EXPERIENCE

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Abstract

In this study, first the nature and objectives of management consulting are considered. The next section addresses reasons for seeking help from consultants. This is followed by a discussion of the nature of general management consulting. Consulting services marketing management are discussed, followed by illustrations of professional consultants' publicity. Consultant service charges are shown. Finally, management of assignment are studied. An extensive topical bibliography is also provided

Keywords: Managing Consultant: A Professional Experience

Nature and Objective of Management Consulting

There are plentiful examples of successful assignments carried out by some of the world's best management consultants for help firms facing bankruptcy, or to give new life to aging companies. They have created a reputation that the consulting management can resolve any management difficulty. But, consultants do not propose miracle solutions to burning issues. However, there are situations where nobody can help. Strong management commitment for ameliorating organizational performance and effective client-consultant collaboration are as crucial to the end result as the quality of the consultant's technical advice. Indirectly or directly, all changes generated with the consultant's help should contribute to improvements in the quality of management and in organizational performance or excellence.

Reasons to Seek Help from Consultants

Benefits exceed the costs. One of the primary benefits of using a consultant is because the benefits ought to exceed costs. The financial issue must be considered when consultants are used.

Learning from consulting. Many clients acquire consultant's special technical knowledge. For example, in an environmental analysis, using microprocessors, business forecasting for management information, and the methods to identify problems and implementing changes (diagnosis, interviewing, persuasion, communication, evaluation, feedback and similar skills). The objective is to bring new competence into the organization. A management consultant enhances management's own competence and knowledge

Management's Decision Roles

A manager may enforce his objectives and may have reached his own decision, but he wants to be able to say that the idea was suggested by an independent consultant. A consultant who accepts such an assignment shall have a political role. This role may be useful if

a manager is facing strong resistance to changes in organization. However, a consultant falls into several group interests.

a. Impartial outside prospect

Because management in the organization is independent of customers and unaffected by its culture, a management consultant can propose a fresh viewpoint and be impartial in situations where no member of the organization itself could be.

b. Intensive professional help on an improvised basis

Senior managers or staff are not able to be released for deep and sustained work on a major problem or project. Consultants provide the time and shall leave the organization once the project is completed.

c. Special skill and knowledge

Consultants are needed when an organization has a lack of staff able to deal with a problem with the same chance of success. Management relies that amelioration needed, but the organization is short of skills for generating, planning and implementing a difficult change. Consultant can support these skills, and helping him to define an appropriate strategy for chance.

General Management Consulting

Management consulting concerns the various aspects including the basic goals, strategy, and the business policy, or structuring, the overall planning and of an organization, as well as control. These problems are general management problems distinct from specialists who service in one functional area with a special technique, for example: accounting, finance, personnel, production, marketing, computer system etc. Problem in general management consulting are as follows: The consultant may be concerned with several functions of the business: technology, production, marketing, organization, and concentrates on the

interaction between these functions and problems. In addition, the consultant ought to be able to view business problems from several aspects, such as business strategy problem may concern technological, financial, economic, psycho-sociological, legal, political, motivational.

Management consultants is able to be of great help to his client who must change his habits, learn how to deal with new functions, and look at the problems of the business from new areas.

A general management consultant must know how to apply the specialist's advice and skill and help the client to do the same, to prevent situations where specialists for example financial analysis or market research will dominate the business. The first contact between the customer and the consultant is usually at the general management level, before the consultant go into specific areas identified by the survey. A comprehensive survey may find a major reorganization, a merger, an acquisition, denationalization or nationalization, or a decision to close down the business. Some comprehensive diagnostic surveys are too late, when the company studied is no longer susceptible of rescue, or when can survival, it require resources that are not available. The company should diagnosis a periodic business as a preventive measure. In some cases, leaders have a particular self-image, which is not shared by other people in the organization. The consultant must persuade management to change thinking and behavior. Consulting in corporate strategy: business strategy, strategic planning, etc. has become grow area of management consulting. Corporate strategy concerns is usually the organization's response to challenges, environmental opportunities and threats, consistent with its resources and competence.

A competitive advantage is a crucial dimension of organizational excellence in environments where organizations must compete with each other. The consultant is able to be most helpful to examine whether the customers business enjoys any competitive advantage, and

to develop a strategy for achieving one. Moreover, the consultant is able to help the client to choose alternatives, for example:

- To sell standard products of acceptable but not specially high quality for very competitive prices; This stresses the fact that the customers has ability to adapt to changed conditions, and to innovate.
- To sell special-design products to customers who prefer to avoid standard products;
- To sell high-quality and specially reliable products for relatively high prices;
- To provide service to customers with speed and reliability superior to that offered by competitors;
- To offer technologically advanced products not available from other enterprises available from very few to abandon these products when the technology becomes common and prices start dropping.

This stresses the customer's ability to adapt to change conditions and to innovate. The role of technology to develop and implement winning corporate strategy is an area where management consultants can be extremely useful to their clients business. The reasons are integrates technology into its strategy significantly improves its chances getting benefits from technological changes, and speed up the movement into production. Some consultants propose to establish R and D departments. Environmental analysis supports new issues of economic, marketing, financial information and demographic. For example, new regulations about product quality, the protection of the natural and living environment can effect the survival of enterprises. Contrary-wise, new regulations can offer new opportunities to enterprises which adapt their products faster than their competitors, or new products that particularly serve the purpose of reduce pollution or increased safety. The consultant can aid the customer to develop competence for

adapting strategy to new opportunities and constraints. Each corporate strategy possesses own requirements as regards the capabilities of the staff and technical profile as well as work style and managerial and employee motivation. Management consultants may be called in when the enterprise deviates substantially from the normal pattern. These may lead to be difficult assignments, uncertain as to the chances of success, always carried out under serve time pressure if the client organization is in financial difficulties. On the other hand, the business can miss an exceptional opportunity if the consultant takes too much time analysis.

When entering a new organization, the consultant should find out as much as possible about its specific culture. Organizational culture may be the cause of the difficulties experienced, for example, the impossibility of submitting new ideas and the conservatism of senior management. This often occurs when a company grows very rapidly. The original culture of small family enterprise may no longer be suitable. There are many new workers and managers, coming from different cultures. Growth by acquisitions may lead to serious cultural. When the operations are internationalized, the problem is how to adapt to foreign cultures. The customer wants his organization to become more innovative, and hopes that the consultant can help. The consultants may conclude that the firm could recover its innovative capability if it removed red tape, reduced centralization of controls and decisions, appointed managers who understood what innovation meant and encouraged experiments, used other rewards to show how innovation was valued by the company, and fostered a climate favorable to innovation. Nowadays, many organizations try to develop incentives that encourage entrepreneurship within corporations. This should be of some interest to management consultants.

Consulting Services Marketing Management

A consulting firm ought to define markets and products, identify their requirements, find clients, and then sell the consulting service to them. Once they have good customers they do not want to lose them. Some consultants have difficulty to sell their services. Some consultants must have meals with potential clients and other useful business contacts. During the meal, he can engage in a technical discussion, aiming to gain the person's confidence and explain how he could be of help. Some consultants can be recommended by existing clients to new prospects. Some consultants can speak at management conferences. The most important of consulting is the professional reputation or image of the consultant. They must convince consumers that they possess enough relevant knowledge and experience to serve him effectively. Concerning client's behavior, some managers reluctance to admit that a consultant is needed. Besides, they have doubts about the consultant's competence and honor. Moreover, they are afraid of becoming dependent on a consultant. In addition, they fear paying excessive consulting fees.

With current and past customers, the situation is different. It can be assumed that they are already familiar with the consulting firms who have worked for them in particular. This means the marketing of new assignments to these customers. Another one can also assume that they will have potential again to be the consultants who gave them good service in the past. Any consultant can lose an excellent customer if a competitive consulting firm have a good marketing job and supplies an attractive new product to that client. If we feel that we can supply a better service than our competitor, and demonstrate this to a potential new client, we should try. Successful marketing of consulting services can present to following principles: First, don't sell more than can be delivered. Then, competence in marketing also concerns the ability to realistically assess our own competence. It is unprofessional to provide distorted information and make look down on competitors in order to influence our client. A sophisticated customer is

likely to look such comments as an expression of weakness, not of strength. Moreover, the professional service, the clients' sensitivity to local cultural norms and values must not be lost from sight in deciding how to market. In addition, some consultants have not respected deadlines at the same quality level. Finally, they need to be interested in the clients' needs and desires as the crucial point of all marketing.

Professional Consultants' Publicity

Writing books that may be read by managers is increasingly popular among consultants. Consulting company materials can become real bestsellers. The promotional effect depends on quality of the publication. Consultants ought to write articles on management and industry topics. Busy managers will not read a book unless they are recommended to them as absolutely essential. Consultants' publications may be published in professional, trade and business journals, which are generally read by wide management public. The reputation of the publication is crucial. Articles in leading periodicals and newspaper definitely guide more new business. More than that, management seminars, conferences or round tables, information sessions, workshops, executive briefings and similar events become very popular in many consulting enterprises. Consultants invite managers to attend a session on a topic of very concern to them, and bring them up to date.

A consulting enterprise can apply its information service for promoting consulting work. Consultants can use advertising to convince customers that their services or products are very necessary for them. It is essential to find out what businessmen and managers read. The advertising must stress the benefits

for which the client is looking more than promoting the enterprises' name and background; clearly inform where and how to contact the consultant.

Advertising on radio and television and mailing publicity materials may not be appropriate for management consultants. Exhibitions of professional materials and services, organized with trade fairs, office equipment and exhibitions of computer, management and training conferences, or professional conventions, also provide opportunities for advertising. Various consultants are members of management associations and similar voluntary membership bodies, local, national, or international. They readily demonstrate talk at meetings free of charge. Directories of professional services exist to the consultant's name and address, directory should normally also indicate his areas of competence. Consultant enterprises' logo and name have their role in communicating the firm's image to the public and to potential clients. It is important to know who has the key role in the company. If consultant is successful as conference speaker or an author, potential clients can easily see his association with the same name.

Every consultant likes clients to come to him. Applying visiting, letters, or telephone calls by consultant to sell his service are the least effective marketing technique. New contracts from potential customers can be made in response to a published announcement to invite consultants to present a technical proposal for running a project. The consultant may be asked to submit additional information, reconsider some of his terms, and pay several visits to the customer. If the consultant decides to compete for such a project he ought to

develop a tactical plan for winning it. For example, he may feel fully competent for the job, but be unknown to the customer. The customer does not make a decision for his final agreement to the assignment until he has seen and reviewed, a technical proposal. The consultant ought to keep their eyes open for further work opportunities and mention these to the customer in an appropriate way. Furthermore, the consultant should examine the past and current marketing practices (information base, organization, strategy, techniques, programme, activities, costs and budgets) and assess their contribution to the development of the enterprise. Moreover, the consultant ought to consider what changes in marketing is necessary in order to meet new requirements of the market. Consulting organizations need sufficient time of orders for several weeks or months ahead without delay. Forward load ought to correspond as closely as possible to the relative numbers of consulting staff of different technical profiles.

Consultant Service Charges

Clients don't like to be charged for work not done directly for them. However, some activities may or may not be charged. Travel expense is an example. Most consultants charge full rate for time spent on traveling to and from the client's office and other travel time required by the assignment. Supervision assignment control and technical guidance also are charged. The cost of service to clients may be charged on the basis of consultant hours or

days or weeks. The consultant ought to find out how competitors calculate fees, and what customers think about their fees. Consultants can learn about the fees charged by colleagues in the profession, who are not competitors. In addition, consultants can apply fees for different market segments. Moreover they can use promotional fees, for example, lower by 15-20 per cent than a normal fee for a new type of service in order to simulate the client's interest. Besides, governmental consulting services can charge lower fees. Sometimes, fees may be determined by clients.

More than that, fee per unit of time may be one hour, one week, or one month. Research assistants and junior consultants must be charged for at lower rate than operating consultants. Furthermore, the consultant can charge for completing a project or job precisely as specified. The client knows how much the whole job shall cost him. He can also know the amount of time of the project. This method is useful for competitive bidding the client can analyze several bids and review them with consultants before selecting one of them. In addition, the fee can be paid only when specific results are achieved, the amount of the fee depends on the size of the results achieved. However it is always very difficult to identify and measure real results different between the consultant and the client. Therefore conflict may occur. Finally, when communicating fees to clients it is better to show professional competence and a good understanding of the client's business before starting to talk about fees. Concerning schedule of payments, sometime, international consulting, consultants try to get an advance payment after signing the contract, if customer agrees to this, he

actually confirms his commitment to the assignment and his confidence in the consultant. However, a schedule of payments may be so important to the customer that it is important to redesign the assignment in order to adjust the step of the work to the client's financial position. Eventually, in the consulting business it is not easy to encourage early and prompt payment by offering cash discounts to clients. Another aspect, consultant must negotiate his fee with a customer who wants to get the job done for a lower price. The consultant ought to prepare suggestions and questions likely to be made by the client. The consultant must sure that customers pay the right price and that the consultant has really delivered what promised. Bills must be issued as soon as records of work performed and expenses are available. The consultant must give information to be provided in a bill. The client ought to know exactly what he is being charged for and why. Consultants should ask for payment to be made within 30 days and hope to receive the money not later than 45 days. There may be local differences. If the consultant see there is a problem, he can contact the client personally and find out the cause of non-payment. If the client still does not pay, the consultant may take a non-paying client to court. Some fees are uncollectible accounts in any country. If bad debts cannot be collected, the consultant ought to deduct for tax purposes.

Management of Assignment

Assignments undertaken by management consultants differ in various respects. In general, an assignment is usually defined in the proposal to the customer and in the contract. The definition includes the beginning and the end

of the assignment, the objectives, the consultants involved, the work programme, the price to be paid, the resources required, from of the client's involvement and the degree, as well as the supervisory responsibility. To examine the clarity of assignment definitions and completeness is a critical precondition of effective assignment management. The crucial key role in managing operating assignments is acted by team leaders or project managers. In function, always includes the preparation and negotiation of new assignment. The senior consultant who negotiates the assignment, prepares the preliminary survey of co-ordinates the drafting of the proposal submitted to the client and the client organization, is then charged with assignment management execution. For management assignment, the team leader must appreciate full responsibility and authority for operating work scheduling, staff time-allocation and organization as well as the nature the advice given to the customer, the method of work, periodic visits to operating consultants of client assignment; technical guidance to operate consultants; assessment monitoring of assignment progress; examine proposals and important reports to be submitted to the client; report assignment progress and mutual commitments. If the assignment does not progress because the client does not spend enough time with the consultant operation, the supervisor ought to raise the matter with the client. The scheduling of the actual start and execution of the assignment may delay. The consultant may select between two or more customers nominating one to be served first, if another client can wait, but there is a risk of delaying a job promised to another client. Consultant operation must check that assignment

progress is up to date and under control. On the other hand, the supervisor must check whether he is accepted with the overall progress of the assignment, the contribution of the operation team, and the relations between the consultants and the client's members. Moreover, he ought to know whether the consultant has met all inputs in the assignment and agreed obligations. Both the consultant and client are concerned about the financial cost of assignment execution. Consulting enterprises budget and control the complete the profit and cost made for every assignment. Finally, the consultant must present the reports to the client at various points of the assignment.

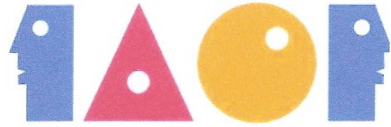
Summary

There are two primary aspects of management consulting. First, it deals with consulting in general management. Second, it is consulting in a specific area or function of management. Management of consulting demonstrates how management consultants can help customers, and how they can operate in these areas. This study shows consulting in various aspects of management. Moreover, management consulting faced with corporate culture issues is considered. Management consultants ought to be more specific to suggest what to do, in order to obtain cultural cohesion. Besides, he can suggest advice how to create a stronger culture to accomplish organizational objectives.

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CURRICULUM DEVELOPMENT IN ENGLISH LANGUAGE TEACHING: INNOVATIONS
AND CHALLENGES FOR THE ASIAN CONTEXT

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Abstract

Over time, language teaching has undergone numerous changes in the theories which underlie it, the methodologies it prescribes, and the procedures it favors. These progressive innovations are an attempt to identify the most effective means of fostering second language acquisition. In recent decades, the approach favored by applied linguists and language educators is Communicative Language Teaching (CLT). This approach is judged to offer the best opportunities for successful second language acquisition. The elements of this approach can be incorporated into a variety of methods of delivery, course content, syllabus structure, and materials type. While CLT is widely and successfully implemented in English as Second Language contexts, its application and success may be limited in English as Foreign Language (EFL) contexts. In EFL environments – and in particular in Asian countries – CLT faces a number of obstacles which hinder its implementation. In an effort to overcome these barriers, curriculum innovations have been developed and implemented, achieving varying levels of success. Research on curriculum innovation advances the boundaries of what is and can be done in the effort to promote the acquisition of English in the global community.

Key words: Language Teaching, "English as a Foreign Language"

Introduction

Language teaching as a profession, though it has its own domain-specific principles, beliefs, values, and philosophies, is not an isolated activity but is part of an educational system. As such, language teaching programs can be said to be governed by organizational principles as are any number of other businesses and operations. This is particularly true in the case of English language teaching (ELT), which in recent decades has grown to be a large and important global endeavor. Whether this spread is in all respects a desirable event (Tollefson, 1995; Canagarajah, 1999; Pennycook, 2003; Phillipson, 2009), it is nonetheless the case that the spread of English as an international language is widely believed to provide economic, educational, and sociocultural benefits (McKay, 2008).

This paper will begin with a brief history of English language teaching, providing an overview of the theories and methods which have guided the discipline over the centuries, highlighting the pedagogical and curriculum changes that have emerged with each new innovation in the field. It will then discuss current best practice related to English language teaching and how that best practice is implemented in foreign countries. The paper will then present the results of research that is being conducted in the author's institution regarding improving the state of English language teaching, in particular as related to curriculum innovation. These studies focus in particular on the Taiwanese context, yet they are applicable to other English as a foreign language (EFL) contexts in general and Asian contexts in particular.

Brief History of Language Teaching: Advances in Theory and Methodology

A core framework in the ELT profession over the last several decades is that put forth by Richards and Rogers (1986), in which they set forth the elements of approach, design, and procedure as a way describe and evaluate the various language teaching methods that have

appeared – and in some cases disappeared – over time. They state that “a method is theoretically related to an approach, is organizationally determined by a design, and is practically realized in procedure” (p. 16). It is beyond the scope of this paper to analyze in detail language teaching methods according to this model; it is sufficient here to consider that all generally accepted methods emerge from and are built upon theoretical principles, are situated in an instructional system, and are implemented in classroom pedagogy.

In the Western world, the teaching of Greek and Latin was based on learning grammar rules and memorizing vocabulary. Because this approach was useful in enabling one to translate from a second language into the native language, it came to be called *Grammar Translation*. In this method, the foreign language taught in the mother tongue, with an emphasis on learning isolated vocabulary words and complex grammatical analysis through context-free drills and text analysis. This method is still popular today in many EFL environments because “it requires few specialized skills on the part of teachers [and] tests of grammar rules and of translations are easy to construct and can be objectively scored” (Brown, 2007:19). Unfortunately, Grammar Translation does little to help a student learn how to genuinely communicate in the foreign language.

The *Direct Method*, similarly in use for over 100 years, is based on the belief that second languages can be learned in much the same way as first languages are learned: no use of the native language in the classroom; emphasis on useful, everyday vocabulary and grammar patterns; inductive teaching of grammar through modeling and practice; and attention given to both speech and listening comprehension. In part due to the difficulty of implementing the Direct Method in the classroom, it fell out of favor in the 1920s. However, key elements of the Direct Method resurfaced in the structural linguistics-based *Audiolingual* method (ALM) of the 1940s.

This method was popular for many years, and adaptations of it can still be found in language classrooms today. ALM was characterized by a heavy dependence of mimicry and memorization, usually in the form of dialogs and pattern drills which were repeated and practiced in order to “overlearn” the grammar structures. Learning was seen as a matter of habit formation; thus, errors were immediately corrected and accurate responses were immediately reinforced.

ALM was in most cases, however, unable to provide students with the ability to transfer their abilities beyond the classroom into genuine communication events. In the 1970s and 1980s the notion of communicative competence gained preeminence in language teaching (Hymes, 1972; Canale & Swain, 1980). In Canale and Swain’s oft-cited model of communicative competence, language learning is seen as the development of abilities not only in grammatical competence, but also in sociolinguistic competence (the ability to use language appropriately according to social norms), discourse competence (the ability to use language in extended discourse rather than simply in de-contextualized words and sentences), and strategic competence (the ability to compensate for one’s language deficiencies through a variety of coping mechanisms). This linguistic paradigm shift led to the development of what is known as *Communicative Language Teaching* (CLT), which is today widely accepted, in its many manifestations, as the dominant approach to language teaching worldwide.

Development of Communicative Language Teaching

CLT may be viewed as “making communicative competence the goal of language teaching and acknowledging the interdependence of language and communication” (Larsen-Freeman, 2000:121). While CLT may be interpreted in multiple fashions and can be seen in an

almost limitless array of classroom procedures and tasks, it generally described as having the following characteristics (Brown, 2007):

- Focus on all aspects of communicative competence
- Focus on authentic language presented and used in meaningful contexts
- Focus on balancing both fluency and accuracy in students' developing language abilities
- Prepare students to use language both productively and receptively in unrehearsed, real-world contexts according to their needs
- Utilize the language teacher as a facilitator and guide in a student-centered classroom rather than as an all-knowing controller in a teacher-dominated environment
- Enable students to be active participants in a collaborative, cooperative learning process

CLT principles and techniques may appear in a number of approaches that have been proposed, implemented, and evaluated in recent years. One such approach is *Task-Based Language Teaching* (TBLT), which focuses on activities that engage learners in language use, with an emphasis on meaning, as they master linguistic objectives. Brown states, "A task-based curriculum specifies what a learner needs to do with the English language in terms of target tasks and organizes a series of pedagogical tasks intended to reach those goals" (2007:51).

Another CLT variation is known as *Content-Based Instruction* (CBI) and the related *English for Specific Purposes* (ESP), in which the learning of specific content takes place through the second language. CBI can be seen in academic settings (e.g., students learning biology in English) and ESP refers to professional contexts (e.g., medical professionals, tourism industry). Both of these approaches allow an integration of language skills (listening, speaking,

reading, and writing) in the development of students' communicative competence. In this way, students are able to fulfill both practical goals and language needs. Another approach which incorporates CLT principles is "experiential learning." This includes "giving students concrete experiences through which they discover language principles by trial and error....giving students opportunities to use language as they grapple with the problem-solving complexities of a variety of concrete experiences" (Brown, 2007:291). In experiential learning, rather than simply learning about a topic, students are directly involved with the subject matter, and "usually there is some physical involvement in the phenomenon as well" (Brown, 2007:291).

With the rapid technological advancements that have occurred – and will undoubtedly continue to occur – *Technology-Enhanced Language Learning Environment* (TELLE) has become an increasingly vital component of CLT worldwide. Technology offers an abundance of teaching and learning opportunities. Word processors, Internet, video and audio media, digital storage options, and the like bring a universe of language teaching materials and tools to almost any location. Through TELLE, key components of a communicative syllabus are available. For instance, there are numerous opportunities for classroom interaction, comprehensible input can be provided, multiple learning styles and strategies are addressed, student collaboration and, simultaneously, student autonomy are supported, and students' affective needs are met (Butler-Pascoe & Wiburg, 2003). The use of technology is particularly promising considering its strong presence in the lives of many of our students in their use of the Internet, iPods, cell phones, Facebook, and the like.

Obstacles to Communicative Language Teaching in EFL Contexts

Notwithstanding the generally-held belief in CLT and its pervasive impact on the field of second language teaching, the implementation of CLT principles in English as a Foreign

Language contexts has proven to be problematic on a number of levels. Even when promoted by official policy, communicative curricula face many obstacles which hinder successful implementation. These problems arise in the domains of the teacher, the students, the educational system, and the construct of CLT itself (Li, 1998; Nishino & Watanabe, 2008).

Teachers may face difficulty in terms of their possessing misconceptions about the elements of CLT, a lack of training or limited opportunities for retraining in CLT techniques, a lack of competence and/or confidence in their own English abilities, and a shortage of time in their work schedule to develop communicative activities. Students may, in addition to having English proficiency which is too low to easily engage in communicative activities, also may show little motivation to learn English as a means of genuine communication (as opposed to developing the ability to pass standardized entrance examinations) and resist the amount and nature of classroom participation required by CLT.

Not all of the difficulties associated with implementing CLT can be attributed to teachers and students, however. Some problems arise out of the nature of the EFL educational system, such as the large class sizes (40 – 50 students) that are common in countries such as Korea, Japan, Taiwan, and elsewhere. And while national ministries of education may officially decree that communicative approaches be utilized (Taiwan Ministry of Education, n.d.), there may still be a reliance on grammar-based examinations, thus leading teachers and students to continue to emphasize traditional, non-communicative classroom methodologies. Further, there may be a lack of financial and administrative support for teachers and programs that endeavor to make the changes necessary to bring about a successful communicative curriculum. Finally, CLT as a method is itself less clearly defined than are other, more traditional methods such as Grammar Translation and Audiolingualism. Therefore, stakeholders throughout the educational system,

from governments to students, may lack clarity on precisely what CLT is, how it can be utilized, and what benefits it can bring.

Overcoming Barriers: Curriculum Innovation in the Asian Context

If the barriers outlined above are going to be overcome, thereby enabling students to develop their English skills while living in their home countries in the most efficient and effective way possible, then researchers and practitioners alike must investigate innovative approaches to mitigating the obstacles that are inherent in EFL contexts. What follows are descriptions of research undertaken by doctoral candidates at the author's institution, Alliant International University in San Diego, California. In these projects, researcher practitioners have designed, implemented, and assessed a variety of innovative approaches toward meeting the language needs of students while simultaneously reducing one or more of the obstacles which typically confront the application of a communicative syllabus in an EFL context.

Implementing a Task-Based Syllabus

As mentioned above, one of the manifestations of CLT can be seen in Task-Based Language Teaching. Given the difficulties of implementing CLT in an EFL context, it is important to know how and to what extent a communicative approach can be applied. A study by Yang (2008) undertook a comparison of university students' English speaking performance when instructed using either CBLT or Grammar Translation (the students' traditional curriculum), both supported by technology in the classroom. 93 students were subjected to one of the two pedagogies over a 12-week period. The TBLT group engaged in tasks such as collaborative discussions and problem solving related to their academic major, hospitality and tourism. The students were also exposed to guest speakers in their field, conducted online

research, participated in mock customer interactions, and as a final project engaged in a simulated job interview.

On a standardized measure of oral proficiency, the students in the TBLT group scored significantly higher gains from pretest to post-test than did the Grammar Translation group. Additionally, post-treatment interviews with students in the TBLT group revealed many insightful perceptions. Excerpts of these student comments are as follows:

- “Finally, I can learn the way I want to learn. This is the first time I felt that English touched my life.”
- “The English teacher asked us what we want to learn. I never had teachers like this.”
- “Before this, I did not know how to work together and how to share my views with team members. I not only improved my speaking ability, but also built good relationships with people.”
- “I found that it is important to let students take responsibility for their learning and understand what is the most benefit for them in their learning progress.”

These comments demonstrate an important change in the students’ attitudes toward English instruction. This change is equally important to – if not more important than – language gains on a traditional test. Such innovations in curriculum as TBLT affect not only students, but the instructor, too, is impacted by the change. It is a learning process in many respects. The TBLT instructor made the following comments:

- “Interestingly, the students were not too shy to talk. They were eager to share their ideas and opinions, even though they used poor English. But how to control the noise in the classroom was a big problem.”

- “I felt the task-based approach created a lower pressure and higher motivation learning environment.”
- “The task-based approach was totally new for me. The students were taught subjects which related to hospitality and tourism English. I think this can help students build their knowledge and enhance their job-related skills.”

Overall, this study concluded that language benefits can derive from a communicative approach, and that its implementation can be facilitated if (a) all participants understand the challenges of curriculum revision at the outset; (b) there is an understanding of the relationship between theory and practice; (c) opportunities are created for students to use the target language in real-world tasks; and (d) students develop an awareness of their learning process and take advantage of the opportunities for genuine communication that emerge from a task-based approach.

Expanding Horizons through an E-mail Project

As discussed above, the use of technology-enhanced learning environments is one of the most promising avenues for curriculum innovation in the language classroom. In the case of young learners, the incorporation of technology is an especially natural blending of language learning with their interests and seemingly natural affinities. Jou (2008) devised a project to increase elementary school students’ opportunities to use English in a genuinely communicative format. This study explored whether 6th grade Taiwanese students’ reading and writing abilities could be improved, and their motivation enhanced, by participating in an e-mail keypal project with American students.

The project treatment consisted of the students from the two countries engaging in e-mail communication with each other for 10 weeks on age- and proficiency level-appropriate topics.

The topics used were related to food, daily routines, special events, leisure activities, and cultural topics (e.g., national holidays). The students were provided writing prompts in these areas, and they were asked to share with each other via e-mail their opinions on the topics, and to follow up in subsequent e-mails with questions and responses in order to create an e-mail “discussion.”

Students’ English reading and writing abilities were measured by scores on the Cambridge Young Learners English test. Statistical analysis showed a significant gain in the post-test scores of the e-mail project group at the conclusion of the study period, and they also demonstrated a statistically significant increase in scores when compared to the non e-mail control group.

The students were also given a Motivation for Learning Questionnaire after the treatment period, and again the e-mail treatment group scored significantly higher in their reported level of motivation when compared with the control group. This survey asked students to rate such statements as “I really enjoy learning English,” “I want to learn English because it is a useful tool,” and “I want to learn English because I like to communicate with foreigners.” Similarly, they took a Confidence for Learning English survey, and once again the e-mail treatment group scored significantly higher in their reported level of confidence when compared with the control group. Statements on this survey included, “I feel confident in my English class,” “I feel confident about having communication with native English speakers,” and “I feel confident having a cultural discussion with native English speakers.”

The Taiwanese 6th grade teacher was interviewed about her experience with the keypal project. Her comments were generally positive, stating that e-mail was an effective tool in improving students’ interaction and communication skills, as well as it being a valuable means to expose students not only to native speakers’ written communication but also in generating cross-

cultural contact. The teacher also felt that her participation in the project helped her to become “a modern English teacher” as she learned about current trends in technology-enhanced curriculum. It also gave her the opportunity “to share my lessons and resources with a teacher in the U.S.” This study demonstrates that while incorporating technology is not always easy (e.g., keeping students on task while on the computers, lag time in the back-and-forth communications, and coordinating with the other teacher and students half a world away), the linguistic, cultural, and interpersonal gains make the effort worthwhile.

English through Video Captioning

In an EFL context, students’ lack of exposure to authentic native speaker English can hinder the development of adequate listening skills. Listening skills can be hampered because the instructor and the students share the same native language. In addition, the opportunities for contact with native English speakers are often rare, if not non-existent. Thus, curriculum designers and classroom teachers must seek novel ways to bring authentic English into the second language classroom. This can be done in a variety of ways which, if used creatively, not only can help students improve their listening abilities, but also may help increase their overall motivation to learn English.

One way to increase students’ exposure to native-speaker English is through the use of movies and television programs in the EFL classroom. One common complaint of students who view English language videos is that the rate of speech is too far beyond their abilities to allow them to understand more than a small amount of the spoken English. The question then becomes, how can teachers increase the amount of language that the students are able to comprehend? A dissertation by Tsai (2010) investigated whether the use of feature films with accompanying subtitles can help improve Taiwan college students’ listening comprehension.

In this study, a combination of quantitative and qualitative methods was used with 126 Taiwanese university students. There were two experimental groups (an English subtitles group and a Chinese subtitles group) and a control group (English audio only; no subtitles). The quantitative analysis included listening comprehension test scores and a questionnaire. Additional data was gathered from the students regarding their perceptions of the use of movies in their English class, as well as survey data from the university English teachers regarding their perceptions of the effectiveness of using films in listening comprehension classes. Qualitative analysis was conducted on interview data collected from 21 students (seven from each group) and six of the English teachers.

The results of this study indicated that students in the experimental groups who watched movies with either English subtitles or Chinese subtitles performed higher on the measure of English listening comprehension than did the control group who did not receive the subtitle treatment. Interestingly, there was no significant difference between the group receiving English subtitles and the group receiving Chinese subtitles. The qualitative findings from the interviews showed a preference both by students and EFL teachers for using feature films with subtitles as a method of helping the students increase their English listening comprehension abilities. These results highlight the effectiveness of using films with subtitles in promoting English learning when students are provided with well designed activities to motivate their viewing and engage them in the English-through-film approach.

Team Teaching

Another issue in the EFL context revolves around whether it is preferable for students to learn English from a native speaker (NS) or from a teacher who shares the same first language (L1) as they do. A case can be made that both approaches can be beneficial. That is, a native

speaking teacher's competence provides the best possible linguistic model in terms of accent, implicit understanding of grammar, syntax, and language use, better knowledge of sociolinguistic rules, and so on. The native speaker's language, though, is not necessarily the best indicator of what an L2 user should strive to achieve (Cook, 1999). That is, a teacher who shares the students' L1 can serve as a more realistic role model in terms of what the students can realistically hope to accomplish in English. In addition, an NNS teacher may provide clearer and more comprehensive language explanations, and may have better explicit knowledge of the second language than a native speaker does.

A curriculum innovation which aims to take advantage of both of these types of teachers is a team teaching approach in which a native English speaker and a non-native speaking (NNS) teacher work together in order to maximize student learning. A study by Tsai (2009) investigated team teaching practices in four Taiwanese junior high schools, looking at interactions between the NS and NNS team teachers, interactions among the team teachers and their students, and the overall effectiveness of the team taught English classes. In order to help identify team teaching best practices, this research examined participants' perspectives toward team teaching and the factors which influence the effectiveness of team teaching.

This study employed a hybrid design, incorporating both qualitative and quantitative data collection methods. Quantitative data was collected by analyzing student test scores on the Cambridge Young Learners English examination and on their high school entrance examination measured against type of instruction: Native speaker teachers teamed with non-native speaker teachers versus non-native speaker teachers working alone. Qualitative data came from classroom observations of team teaching and interviews with the teacher participants.

This research revealed that there are difficulties associated with the team teaching model, even though on the surface it appears to be a superior method of instruction. The quantitative results showed that there was a statistically significant difference in favor of the students in the non-team teaching environment on both their YLE test scores and based on archival records of high school entrance examination scores. Analysis of the teacher survey revealed that the teachers judge team teaching and solo teaching to be equally effective. The NNS teachers were more satisfied with and preferred solo teaching versus team teaching. The student survey likewise showed no difference in preference or satisfaction between team and solo teaching.

The qualitative data from observations and interviews revealed that various team teaching models employed in the four schools resulted in variable outcomes. The qualitative data from interviews and open-ended questions of the teacher and student surveys showed that systemic, institutional factors are more critical than the individual difference factors in providing positive team teaching outcomes. For example, there were perceived discrepancies in the nature and amount of work conducted by the team partners, classroom management difficulties, scheduling difficulties, personality differences, and lack of professional training and administrative support. Despite these challenges, analysis of the team teaching practices studied in this dissertation demonstrate that there is great potential in this innovative curriculum model, though its implementation is not simple and these situational factors need to be resolved in order to maximize the benefits of this alternative approach to English education.

Next Steps in Curriculum Innovation

The research described above provides insight into the work that is being done by language teaching professionals to create, implement, and evaluate curriculum innovations whose goal is to improve the English abilities of students in EFL contexts. This work continues

globally, and its relevance to and importance in facilitating international cooperation through better communication cannot be overstated. Further innovations in this area of English language education continue, and one promising model is the emergence of English Villages throughout Asia.

English Village

The English Village (EV) concept, which originated in Korea, is a way to implement CLT by immersing students into an all-English environment which is based on real-world theme rooms. These rooms represent authentic situations such as hotels, supermarkets, restaurants, doctor's office, and so on. The original idea of setting up the South Korean English Villages and the specially designed English programs was, in part, (a) to give students opportunities to experience an all-English environment, (b) to improve students' English skills in an easy and fun way, (c) to decrease the cost of English education, (d) to give students an alternative choice to study English without going abroad, and (e) to train students in global awareness and international viewpoints by learning English (Chen and Huang, 2007).

In recent years the English Village concept has been evaluated by Taiwanese educators, and English Villages have begun to become operational at several locations throughout the country, first in Taoyuan and subsequently in Kaoshiung County. The English Villages in Kaoshiung are being investigated by two doctoral researchers at Alliant International University. Details of that research can be found in separate papers to be delivered at this conference. A brief description of the English Village curriculum is provided here.

Based on the construct of experiential learning, the English Village environment contains three key elements, which are (1) the theme classrooms, (2) native English-speaking teachers, and (3) the English curriculum. These three features form the basis of the Taiwanese English

Village program. The idea of theme classrooms is based on the concept of motivating and fun learning. Each theme classroom provides a rich visual stimuli and pedagogically sound materials. All of the layout and furniture in the theme classrooms are related to the real-world context. The theme classrooms thus become a tool for raising student's motivation and a way to bring everyday English to life, and they are designed to meet the students' developmental, intellectual, and emotional needs.

The second essential component of the Taiwanese English Village program is that the English classes are principally taught by native English-speaking instructors who are assisted by Taiwanese teachers. Because a primary goal of the Taiwanese English Villages is to give students an all-English environment, native English-speaking teachers fulfill a key function by instructing the English Village classes. They are a key component to meeting the aims of (a) developing students' communicative skills (especially focusing on listening and speaking skills); (b) increasing students' understanding of Western culture; and (c) fostering a positive attitude among students toward learning English.

The English Village program in Taiwan offers four types of English curricula, including regular English Village program, one-day tour program, weekend program, and summer/winter camps program. While specifics of the EV program vary according to grade level, the following format is generally utilized in some form: In the regular program, students attend the English Village one class period per week, and rotate to a new theme room every month. Prior to attending the English Village, the regular (non-EV) English class introduces the topic and vocabulary of the theme room in order to activate students' prior knowledge. After studying in the theme room, the regular English class bridges the content by conducting related follow-up activities.

The one-day program is available to surrounding schools which wish to provide their students the opportunity to experience English in the theme room environment. The weekend program offers parents and children a half-day experience together through which the parents can learn approaches to bringing English education to their children. The three-day summer and winter camps provide students with activities during their break from school. In addition to English lessons, the camp programs also provide physical education (e.g., yoga, tumbling, basketball, badminton). The theme-based lessons and physical education are taught by native English-speaking teachers and are assisted by Taiwanese English teachers. The primary purpose of providing this English camp program is to let students experience both language and sport instruction in a pleasant atmosphere.

The innovative English Village programs aim to raise students' interests and motivation toward learning English by providing students an interesting and fun learning environment, in which it is hoped that students can acquire English naturally in simulated theme classrooms. Both native and non-native English-speaking teachers collaborate to ensure that cultural and communication gaps are narrowed. Students can reduce their anxiety of meeting foreigners, as well as help them improve their speaking abilities and gain more confidence to speak English to native speakers. In sum, the English Village program is a key component in developing EFL students' lifelong interest in learning English and becoming more globally oriented.

Conclusion

Innovation, whether in language teaching or other professions and disciplines, is not a simple undertaking. Nor are its results guaranteed. In order to optimize the likelihood of implementing change successfully, several steps can and should be taken:

- Make sure that not only is change needed, but that the relevant stakeholders perceive the need for change;
- Plan change that is neither too great (which generates greater resistance) nor too small (which undercuts the importance of the change), both of which may cause the change to fail;
- Make sure that the change is both practical and realizable, and that obstacles do not exist which will prevent success;
- Use a wide range of change strategies, including enlisting the necessary support (in particular from those in authority), developing and maintaining clear communication so that all affected parties are aware of the change process, and including others' participation in the process so that they have a sense of ownership. (Nation & Macalister, 2010: 173)

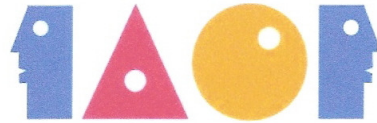
This paper has illuminated recent trends in implementing curriculum innovation in language teaching in an effort to improve the successful learning of English in EFL contexts. The research reported here represents a sampling of the work that is being done in this regard, and the aim of making this research known is to motivate support for such efforts not only within academia but from all elements of society, from government to industry to social acceptance, for the continuation of such efforts.

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BANK MARGIN-SETTING BEHAVIOR VERSUS RISK-MANAGING BEHAVIOR UNDER
CORPORATE GOVERNANCE
AND INFORMATION ASYMMETRY

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Abstract

Managing the provision of bank liquidity requires a strategy that balances returns and risks. We argue that if a bank's optimal liquidity allocation is determined treating risk or return distribution as constant, higher risk could lead to higher return (higher interest margin in our model). Within the firm-theoretic approach, we show that an increase in corporate governance increases risk but decreases return.

On the other hand, if a bank's optimal liquidity allocation is determined by solving a portfolio problem that takes return as given, higher return could lead to higher risk. Within the portfolio-theoretic approach, we show that an increase in corporate governance increases return and risk. It is also shown that an increase in information asymmetry decreases return and risk in both the approaches. One immediate application of this paper is that a forced switch between these two approaches may lead to inefficiency.

Keywords: Bank Interest Margin, Risk, Corporate Governance, Information Asymmetry,
Liquidity Management

Introduction

Most managers would agree that liquidity management is a key element of the banking business. Without liquidity, a bank simply cannot function. Optimum liquidity is achieved by balancing returns and risks, the financial theory widely used by both academics and practitioners. Commercial banks are institutions that generally engage in two distinct behavioral modes of managing liquidity: return (or interest margin) management, and risk management. More precisely, the interest margin management of the firm-theoretic approach involves consciously setting rates in anticipation of market competition. This in turn influences discussions of bank return determination and thus the firm's sequential risk taking. Conversely, the risk management of the portfolio-theoretic approach involves determining risk in view of uncertainty. Risk management influences bank risk taking and thus the firm's sequential return determination. A great deal of theoretical and empirical analysis has been devoted to understanding how portfolio analysis can help model the risk management by commercial banks, as well as the management of profit.

In requiring the liquidity services of banks, neither behavioral mode is mutually exclusive; rather, both modes are sequential. For example, Padoa-Schioppa (2001) demonstrates that banks become relatively conservative when they can earn monopoly rents. Boyd and Nicolo (2005) show that there exists a fundamental risk-incentive mechanism, causing banks to take greater risks as their markets become more concentrated. Allen and Gale (2000) study an environment in which banks choose a parameter that determines the default risk of their assets, and are Cournot-Nash competitions in deposit markets. We note that the previous literature will incorporate two distinct management paradigms: the former (Padoa-Schioppa (2001), and Boyd and Nicolo (2005)) applies when return on profit management must be made in the presence of fixed risk

management, whereas the latter (Allen and Gale (2004)) applies when risk management must be made in the presence of fixed return management. While much has been learned from those works, neither has conclusively addressed a fundamental problem, namely that the ongoing debate about the relation between return and risks requires a distinction between 1) the impact on return management from risk management, and 2) the impact on risk management from return management. For example, the expected stock market return was long considered to be constant until a relatively recent study documenting the predictability of market returns (Fama and French (1989)). It is now understood that expected returns varying over time are consistent with rational expectations. See Guo (2004) for recent examples. Backus and Gregory (1993) show that the correlation between risk and return can be positive or negative depending on the time-series properties of the pricing kernel. The risk-return relation can vary over time, as observed by Whitelaw (1994). Campbell and Hentschel (1992), and Wu (2001) emphasize the importance of the volatility feedback effect in detecting the risk-return relation.

Furthermore, bank liquidity is regularly monitored and adjusted to reflect banks' changing expectations of financial conditions and market demands. The effects of corporate governance and information asymmetry on equity returns and risks are important issues in corporate finance. Gompers, Ishii, and Metrick (2003), and Cremers and Nair (2005) point out that management constraints and incentives are the mechanisms through which corporate governance influences equity returns and the distribution of returns. This paper extends the current understanding by showing how corporate governance influences bank returns via risk management, and alternatively, bank risks through returns management. One intriguing result is that forcing a switch between these alternatives may lead to large inefficiencies.

Whether corporate governance affects firm performance is a matter of much study and

debate. For a survey on corporate governance, see Shleifer and Vishny (1997). In an important paper, Gompers, Ishii, and Metrick (2003) find that firms with weak shareholder rights exhibit significant stock market underperformance. Core, Guay, and Rusticus (2006) find that if the relation between poor governance and poor returns is causal, firms with weak shareholder rights exhibit significant operating underperformance. Previous studies, however, omit the consideration of sequence in risk-taking and price-setting. Unlike previous literature, the model developed in this paper is utility-free and market-value based. It is derived in the spirit of Merton's (1989) use of contingent claim analysis to evaluate financial institutions. The principal advantage of this approach is its explicit treatment of interest margin determination and uncertainty, which have long played a prominent role in discussions of equity-dependent intermediary behavior. We show that (i) banks with weak shareholder rights exhibit significant interest margin performance when governance influences bank margin through the manipulation of bank risk, whereas (ii) banks with weak shareholder rights exhibit significant interest margin underperformance when governance influences only bank margin, without attending to its affect on bank risk. In addition, we show that banks with weak shareholder rights exhibit significant volatility in the case of (i), and only insignificant volatility in the case of (ii).

The effect of corporate governance on equity return and the subsequent distribution of return, or on the distribution of equity return and its subsequent return, is an important issue in corporate finance. Ferreira and Laux (2007) point out that any systematic effect on return or the distribution of return also requires a link between governance provisions and investors' expectations or information. Rather than emphasizing the link between corporate governance between information asymmetry, this paper shows how information asymmetry influences equity return and its distribution in the alternative paradigms discussed previously. Comparative static

results show that in either paradigm, banks with high information asymmetry exhibit low bank return and distribution. The overall conclusion is that many conclusions about corporate governance and information asymmetry derive from models of risk-managing behavior that cannot be generalized to models of margin-setting behavior.

This paper is structured as follows. In the next section, we present the model and its assumptions, and we define the bank's relevant maximization problem. Section III derives the solutions of the model and the comparative static analysis when corporate governance and information asymmetry influence bank returns through bank risks. Section IV derives the solutions and comparative static results when corporate governance and information asymmetry influence bank risks through bank returns. The final section discusses the results and implications of the model.

The Model

Measures of liquidity provision must be high enough to meet even unexpected changes in liquidity needs and sources. Yet liquidity that is too high creates opportunity cost through excessive near-cash assets. To analyze the problem, we examine banking firm behavior under a two-period model. The model is designed to reflect the following liquidity characteristics of the bank: (i) the bank's role is to provide funds to its customers on demand; but (ii) it finds it costly to unexpectedly raise external finance, even under corporate governance; so (iii) it maintains a buffer stock of liquid assets; and (iv) holding the buffer stock is also costly. Banks must anticipate an ex post flow cost of raising new external finance as well as an ex ante stock cost of holding liquid assets. Note that We follow Froot and Stein (1998), and Kashyap, Rajan, and Stein (2002) and develop a banking-firm model with exactly this structure.

Under a paradigm that acknowledges synergy between deposit-taking and lending, the question of how banks provide liquidity has far-reaching implications. Following Kashyap, Rajan, and Stein (2002), we argue that there may indeed be significant synergies between deposit-taking and lending. For the view that there is no synergy, see, for example, Litan (1988), and Gorton and Pennacchi (1992). Our basic model focuses on a financial product that distinguishes banks from other lenders, such as finance companies: loan commitments or credit lines. A key feature of commitment is that a borrower has the option to take the loan down on demand over the two-period horizon. Simply put, once the decision to extend a commitment is made, it behaves just like a demand deposit. The customer can show up any time and withdraw funds. Thus, both demand deposits and loan commitments offer to bank customers a very similar service: the provision of liquidity on demand to meet unpredictable needs.

Risk applies to liquidity models of bank behavior in various ways, principally: random loan, loan commitment, and security returns, and random deposit suppliers. Although this paper uses security and deposit flows to determine the behavior of the banking firm, random loan and loan commitment returns are at the heart of the liquidity problem at this type of financial institution. Sealey (1980) stresses that a key function of a depository financial intermediary is to provide liquidity in the form of deposit supplies. Holmstrom and Tirole (1998) emphasize that a key function of an intermediary is to provide liquidity in form of loan commitments.

To do this, loan demand faced by the bank can be specified through the implicit demand function, $\phi_L(L, R_L, \hat{\sigma}^2) = 0$, when L and R_L are the quantity demanded and interest rate on a homogeneous type of loans, respectively. $\hat{\sigma}^2$ is the variance of the return on the bank's loans. When loan demands are random, two modes of behavior are possible in the loan market. First, the bank may be a quantity-setter and face random loan rates. This mode of behavior has been

investigated by writers such as Kashyap, Rajan, and Stein (2002). Second, the bank may set loan rates and face a random loan level. Zarruk and Madura (1992), and Wong (1997), for example, consider variations in this behavioral mode. We argue that one of the most interesting effects of financial deregulation is loan rate-setting behavior. We can assume that the bank is a loan rate setter and loan demand is a downward-sloping function of the loan rate. This assumption implies that the bank has some market power in lending (see Hannan (1991), and Cosimano and McDonald (1998)). Both loan rate and increasing variance in making loans increases the scale of lending activities. The causes of loan demand are unimportant for our purposes, so this simple reduced-form approach is sufficient. Thus, assuming the function ϕ_L has continuous partial derivatives, the loan demand function can be restated for the rate-setting bank as $L = L(R_L, \hat{\sigma}^2)$, $\partial L / \partial R_L < 0$, and $\partial L / \partial \hat{\sigma}^2 > 0$. There are three dates in this two-period model: 0, 1, and 2. The bank makes risky loans at date 0 (at the start of the first period) which mature and are paid off at date 2 (at the end of the second period).

In addition to risky loans, the bank may issue loan commitments at date 0, which obligate the bank to provide funds to borrowers on date 1. An important motivation may be that commitments provide insurance against a future inability to borrow. As pointed out by Holmstrom and Tirole (1998), upon the realization of an unexpected adverse shock, a borrower may have insufficient collateral to raise external finance. The borrower may be liquidated, even though it has significant non-pledge able value as an ongoing concern. Under the circumstances, the borrower may wish to buy a commitment that effectively functions as an insurance policy against the adverse state.

In addition, Holmstrom and Tirole (1998) stress that a primary function of a banking firm is to provide liquidity in the form of loan commitments or credit lines. In this paper we further link

the commitment decision to the bank's corporate governance. A large amount of all commercial and industrial loans are made under loan commitments. Depending on how they are written, commitments may or may not be legally binding on the part of the bank, regardless of whether they are directly monitored. Thus, this basic model makes a *ceteris paribus* assumption that a greater board diligence (corporate governance) will lead to the issuance of fewer credit lines.

Loan commitment demand can be specified through the implicit demand function, $\phi_C(C, R_C, \hat{\sigma}^2, g) = 0$, where C and R_C are the quantity demanded and interest rate on loan commitments, respectively. The volatility in this function is simply assumed equivalent to the variance of the risky loans. Note that it is recognized that the volatility in the commitment demand function may be different from that in the loan demand function. Adding this complexity affects none of the qualitative results. g is defined as the degree of corporate governance, effectively monitoring how the board's diligence affects the bank's equity value through the provision of loan commitments. Again, we assume that the bank has some market power in commitment lending (see Kashyap, Rajan, and Stein (2002)), specified through a downward-sloping function of the commitment rate. It is also assumed that an increase in the variance of commitment-making reflects the increasing scale of commitment-providing activities. We also apply Hermalin (2005) and assume that since monitoring is costly, an increase in the degree of the corporate governance decreases the scale of commitment-providing activities. Thus, the commitment-demand function can be restated for the rate-setting banks as $C = C(R_C, \hat{\sigma}^2, g)$, $\partial C / \partial R_C < 0$, $\partial C / \partial \hat{\sigma}^2 > 0$, and $\partial C / \partial g < 0$. At date 0, the bank sells C dollars of commitment contracts and receives a zero premium per dollar of commitments. In Kashyap, Rajan, and Stein (2002), the bank is assumed to receive a constant premium per dollar of commitments. Adding this assumption is not expected to affect the results of our model. At date 1, a random fraction z

of the commitments are taken down, where z is 0 or 1 with equal probability. Those borrowers who do take down the commitments pay an interest rate of R_C on the balance outstanding between date 1 and date 2.

At date 2, the bank's total repayments from the risky-asset portfolio are as follow. (For our calculations, it is convenient to assume $z = 1$.)

$$V \begin{cases} = (1 + R_L)L + (1 + R_C)C = V^0 & \text{if credit risk} = 0 \\ < V^0 & \text{if credit risk} > 0 \end{cases} \quad (1)$$

In addition to its risky-asset portfolio, the bank can also hold an amount of B_0 of liquid assets on its balance sheet between date 0 and date 1 -- Treasury bills, for example. It is assumed that these assets earn the security-market interest rate of R . But we further assume that this earning is partially offset by a proportional deadweight cost of τ per dollar held. At date 1, some of the liquid assets may be drawn down, leaving a remaining balance of B_1 to be held until date 2. B_1 continues to earn the rate of R between date 1 and date 2, but for simplicity we assume that $\tau = 0$. Thus, at date 2, the bank's total repayments from the earning-asset portfolio can be stated as:

$$A = V + B \quad (2)$$

where,

$$B = (1 + R - \tau)B_0 + (1 + R)B_1$$

The earning-asset portfolio to be financed at date 0 is $L + B_0$. The portfolio is financed partly by demandable deposits. At date 0, the bank accepts D_0 dollars of deposits. The bank provides depositors with a rate of return equal to the risk-free market rate, R_D . The disadvantage of deposits is that a random fraction w of those who deposit at date 0 may withdraw at date 1,

where w is 0 or 1 with equal probability. Thus, the bank's total payments of deposits at date 2 are given by $D = R_F D_0$, where, $R_F = (1 + R_D) + (1 + R_D)(1 - w)$.

In addition to deposit liability, the bank can also issue claims in the public market at either date 0 or date 1, denoted by K_0 and K_1 , respectively. These claims mature at date 2, and can be thought of as equity. We further consider two crucial factors in the bank's issuing of claims in the public market. First, there are information asymmetries between the bank and investors. As pointed out by Kashyap, Rajan, and Stein (2002), there is potential for adverse selection in the capital market. For instance, the bank may gain some inside information as to the quality of its earning-asset portfolio, and use this information to exploit new investors. This phenomenon is recognized as a kind of capital market imperfection. Specifically, external financing increases in relation to the degree of capital market imperfections.

Second, internal and external governance mechanisms interact to affect liquidity management. Stockholders and the board of directors often serve as the primary internal monitoring mechanism (see Kang and Shivdasani (1995), and Gorton and Schmid (1999)), while takeover and the market for corporate control act as the primary external mechanism (see Easterbook and Fischel (1991), and Jensen (1993)). As pointed out by Gillan, Hartgell, and Starks (2003), greater board independence is found in firms that are less exposed to takeovers. Accordingly, we can argue that a large shareholder has incentives to monitor the management and pay for part of the gains that occur through takeovers, thus making the appearance of a bidder more likely. Consequently, the presence of a large shareholder (an internal governance mechanism) can be crucial to facilitating takeovers (an external governance mechanism), perhaps through external financing. In such a scenario, the internal governance mechanism is required for

the external mechanism to function, which leads to a complementary relation between these mechanisms (see Cremers and Nair (2005)).

The next step in the argument is, the capital structure that there are no information asymmetries between the bank and investors, and no governance mechanisms interacting to affect liquidity management at date 0. The cumulative payments on the claims issued at this time are $2(1+R)K_0$. However, at date 1, there is the potential for adverse selection in the capital market, and a large shareholder has incentives to monitor the management. K_1 , the amount of incremental funds raised at date 1, is a positive function of the degree of capital market imperfection and of the degree of corporate governance, $K_1 = K_1(\alpha, g)$, $\partial K_1 / \partial \alpha > 0$, and $\partial K_1 / \partial g > 0$. The payments on the claims issued at date 1 are $(1+R)K_1$. Thus, the total payments of the external finance at date 2 are:

$$K = 2(1+R)K_0 + (1+R)K_1 \quad (3)$$

K_0 , equity capital held by the bank, is tied by regulation in fixed proportion q to its deposit amount, $K_0 \geq qD_0$. We follow Zarruk and Madura (1992) and assume that the required capital-to-deposits ratio q is an increasing function of the amount of the loans held by the bank at date 0, $\partial q / \partial L > 0$. The interpretation of K_1 follows a similar argument as K_0 ,

$(K_0 + K_1) > q(1-w)D_0$. q is also a positive function of the amount of loan commitments held by the bank $\partial q / \partial C > 0$ between date 1 and date 2. For purposes of simplicity, let $q' = \partial q / \partial L = \partial q / \partial C$, where q' remains constant during the two-period horizon.

As noted by Santomero (1984), the choice of an appropriate goal in modeling bank optimization remains controversial but crucial. Sealey's (1980) model of optimal bank behavior integrates the risk considerations of the portfolio-theoretic approach with the market conditions

and rate-setting behavioral modes of the firm-theoretic approach. In this integrated approach, the bank's objective is to set loan amount and deposit rate to maximize the expected value of a Von Neumann-Morgenstern utility function defined in terms of profits. The selection of the objective in Sealy's (1980) model assumes that the bank's manager maximizes either his own expected utility, or that of those who exercise control over the bank's decisions. The principal advantage of the integrated approach is the explicit treatment of uncertainty and interest rate determination. This approach, however, ignores the market-value optimization in bank operations.

We question the applicability of Sealey's integrated approach to bank behavior. Sealey (1980) bases his criticism on the existence of imperfectly competitive markets and shows that some basic theorems of portfolio theory are not applicable under imperfect market structures. This approach, however, still ignores the market-value optimization of portfolio theory in bank decisions. We use an alternative model supplementing Sealey's (1980) integrated approach with an option-based valuation. Our option-based integrated approach allows the inclusion of more realistic market conditions along with a more appropriate behavioral model of risk consideration. Hence, the value of equity can be treated as a contingent claim written on the value of the bank's risky-asset portfolio. Applying Rubinstein's (1983) displaced diffusion option pricing model, our approach prices equity when the bank's asset composition changes stochastically due to varying risk among assets. To do so, we apply Merton's (1974) model, in which the market-value equity of a bank is viewed as a call option on its risky-asset portfolio. We reason that equity holders are residual claimants on the bank's risky assets after all other obligations have been met. The strike price of the call option is the book value of the bank's liabilities. When the value of the bank's risky assets is less than the strike price, the value of equity is equal to zero.

With all these assumptions in place, the relevant maximization problem is:

$$\text{Max } S = VN(d_1) - Ze^{-\delta} N(d_2) \quad (4)$$

where,

$$Z = D + K - B$$

$$d_1 = \frac{1}{\hat{\sigma}} \left[\ln \frac{V}{Z} + \delta + \frac{1}{2} \hat{\sigma}^2 \right]$$

$$d_2 = d_1 - \hat{\sigma}$$

$$\hat{\sigma}^2 = \hat{\sigma}_v^2 + \hat{\sigma}_1^2 - 2\rho_{v,1}\sigma_v\sigma_1$$

$$\delta = R - R_D$$

In equation (4), the strike price Z is defined as the net obligation, or the difference between the payments to debt-holders and the repayments from the liquid-asset borrowers. The cumulative standard normal distributions of $N(d_1)$ and $N(d_2)$ are the risk-adjusted factors of V and Z , respectively. $\hat{\sigma}^2$ is variance of $\hat{\sigma}_v$ and $\hat{\sigma}_1$ being the instantaneous standard deviations of the rates of return on V and Z , respectively. δ is the deposit rate spread between R and R_D . When the net obligations are riskless, for example, the instantaneous interest rate is constant, and volatility consists simply of the variance of risky assets, $\hat{\sigma}^2 = \hat{\sigma}_v^2$. Note that our model is similar in structure to Rubinstein's (1983). We are now ready to solve for the bank's optimal choice of R_L, R_C , and $\hat{\sigma}^2$. In so doing, the bank faces the following liquidity constraints:

$$L + B_0 = D_0 + K_0 = K_0 \left(\frac{1}{q} + 1 \right) \quad (5)$$

$$L + C + B_1 = D_0(1 - w) + K_0 + K_1 = (K_0 + K_1) \left(\frac{1}{q} + 1 \right) \quad (6)$$

$$B_1 \geq 0 \quad (7)$$

Constraints (5) and (6) are balance sheet identities for date 0 and date 1, respectively. As mentioned previously, since it is costly to raise funds from the public at date 1, the bank will, if need be, liquidate its entire liquid assets at date 1 to meet the demand of depositors or borrowers. However, if this is insufficient, new funds will have to be obtained through a costly public issue and not through short sales (and hence $B_1 \geq 0$).

As liquidity providers, banks in particular must balance return and risk to maximize shareholder wealth. One of our primary emphases is the selection of the bank's optimal margin: the difference between the rate of interest the bank charges borrowers and the rate it pays to depositors. Mercer (1992) reports that earnings from the margin significantly account for bank profits or returns. As the margin is so important to bank profitability, the issue of how it is determined deserves closer scrutiny. In our model, the determinations of loan rate and commitment rate can be equivalently treated as the determination of the margin, since the bank is assumed to face a perfectly competitive deposit market. Thus, we use the three terms, margin, profit or return, interchangeably in what follows. As mentioned previously, one may debate whether banks should choose an alternative approach to optimization. There is empirical evidence that some banks have some market power in lending activities. Empirical evidence by Slovin and Sushka (1984), and Hancock (1986) supports the presence of rate-setting behavior in loan markets. There may be two motivations behind such evidence. First, in the first stage, the variance or risk of the risky-asset portfolio is determined when the return from the lending activities remains fixed. In the second stage, the risk of the risky-asset portfolio is revealed and the return is determined. As we see below, the risk influences the bank's return decision. The return decision is made taking into account the risk choice made in the first stage. Conversely, in the first stage, risk decision is made bearing in mind its impact on the equilibrium of the return

stage. The two-stage game is usually solved by backward induction. Applying that method here, we solve for the return stage first and then examine the risk stage. Second, applying an alternative method, we solve for the risk stage first and then examine the return stage. Any sub game is characterized by equilibrium play and the solution of the first stage takes into account the fact that equilibrium play occurs in the second stage. Thus, these equilibrium results are considered sequentially

Solutions and Results: Firm-Theoretic Approach

In this section, we offer that banks choose their loan rate and commitment rate to maximize equity return in the second stage of the two-stage game. Formally, the bank operates thusly:

$$\text{Max}_{R_L, R_C} I(R_L, R_C, \hat{\sigma}^2) \quad (8)$$

where $I(\cdot)$ is defined as in equation (4). The first order conditions of equation (8) are

$$\frac{\partial I}{\partial R_L} = \frac{\partial V(R_L, R_C, \hat{\sigma}^2)}{\partial R_L} N(d_1) - \frac{\partial Z(R_L, R_C, \hat{\sigma}^2)}{\partial R_L} e^{-\delta} N(d_2) = 0 \quad (9)$$

$$\frac{\partial I}{\partial R_C} = \frac{\partial V(R_L, R_C, \hat{\sigma}^2)}{\partial R_C} N(d_1) - \frac{\partial Z(R_L, R_C, \hat{\sigma}^2)}{\partial R_C} e^{-\delta} N(d_2) = 0 \quad (10)$$

Equations (9) and (10) determine the optimal loan rate and the optimal commitment rate of the bank. We require that the second order condition be satisfied, $\partial^2 I / \partial R_L^2 < 0$, and

$\partial^2 I / \partial R_C^2 < 0$. To ensure that a unique market equilibrium obtains, we assume

$$\Delta_I = (\partial^2 I / \partial R_L^2)(\partial^2 I / \partial R_C^2) - (\partial^2 I / \partial R_L \partial R_C)(\partial^2 I / \partial R_C \partial R_L) > 0.$$

These assumptions imply that the first order conditions characterize a unique optimal bundle of loan rate and commitment rate in response to its risk decision. Solving for the

equilibrium bundle as a function of the variance yields the mappings, $R_L(\hat{\sigma}^2)$ and $R_C(\hat{\sigma}^2)$.

These mappings characterize the bank's equilibrium bundle as a function of its variance. The assumptions of the unique market equilibrium bundle guarantee these mappings exist. They are used in the computation of the equilibrium in the first stage.

In equation (9), the term associated with $N(d_1)$ represents the marginal risk-adjusted risky-asset repayments of loan rate, and the term associated with $N(d_2)$ represents the marginal risk-adjusted net-obligation payments of loan rate. The equilibrium condition of equation (9) demonstrates that both negative marginal values of loan rate are equal (see Appendix 1). The interpretation of the two terms associated with $N(d_1)$ and $N(d_2)$ in equation (10) is similar to those of equation (9). The equilibrium condition of equation (10) also shows that both negative marginal values of commitment rate are equal (see Appendix 2).

Under the framework of our model, we next consider the impact of changes in variance of equity return on the bank's optimal loan rate and commitment rate. This consideration demonstrates that the risk of the bank's equity return has an important consequence for loan rate and commitment rate. These comparative static results may be derived first, by totally differentiating equations (9) and (10) for both the interest rates, then by solving for these effects using Cramer's rule. These results may be reinterpreted as producing an equilibrium as follows:

$$\frac{\partial R_L}{\partial \hat{\sigma}^2} = -\left(\frac{\partial^2 I}{\partial R_L \partial \hat{\sigma}^2} \frac{\partial^2 I}{\partial R_L^2} - \frac{\partial^2 I}{\partial R_L \partial R_C} \frac{\partial^2 I}{\partial R_C \partial \hat{\sigma}^2}\right) / \Delta_I \quad (11)$$

$$\frac{\partial R_C}{\partial \hat{\sigma}^2} = -\left(\frac{\partial^2 I}{\partial R_L^2} \frac{\partial^2 I}{\partial R_C \partial \hat{\sigma}^2} - \frac{\partial^2 I}{\partial R_L \partial \hat{\sigma}^2} \frac{\partial^2 I}{\partial R_C \partial R_L}\right) / \Delta_I \quad (12)$$

where,

$$\frac{\partial^2 I}{\partial R_L \partial \hat{\sigma}^2} = \frac{\partial V}{\partial R_L} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial \hat{\sigma}^2} + \frac{\partial Z}{\partial R_L} e^{-\delta} \frac{\partial N}{\partial d_2} \frac{1}{2\hat{\sigma}^2}$$

$$\frac{\partial^2 I}{\partial R_C \partial \hat{\sigma}^2} = \frac{\partial V}{\partial R_C} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial \hat{\sigma}^2} + \frac{\partial Z}{\partial R_C} e^{-\delta} \frac{\partial N}{\partial d_2} \frac{1}{2\hat{\sigma}^2}$$

$$\frac{\partial d_1}{\partial \hat{\sigma}^2} = \frac{1}{2\hat{\sigma}^2} \left(\frac{1}{2} - d_1 \right)$$

Before proceeding with the comparative static results of equations (11) and (12), the following terms need classification. First, the term $(\partial N / \partial d_1) - (N(d_1) / N(d_2))(\partial N / \partial d_2)$ is defined as the risk elasticity effect. The sign of this effect is equivalent to the sign of the difference between $1/b_1 = (N(d_1) / d_1) / (\partial N / \partial d_1)$, the reciprocal distribution elasticity of the risk-adjusted risky-asset repayments, and $1/b_2 = (N(d_2) / d_2) / (\partial N / \partial d_2)$, the reciprocal distribution elasticity of the risk-adjusted net-obligation payments. The difference of these terms describes the bank's risk magnitude for the market value of equity return under the option-based valuation. When $b_1 > b_2$, a convenient explanation of the negative risk elasticity effect can be offered: the bank's equity returns faces an increasing magnitude of risk. The distribution elasticity of the call option on the risky repayments is more significant than that on the strike price that is the book value or default-free value of the bank's net-obligation payments. That is, the bank operates in a bad or higher state of risk. Similarly, the bank is assumed to operate under less risk when the risky elasticity effect is positive ($b_1 < b_2$).

Second, the term $\partial d_1 / \partial \hat{\sigma}^2$ describes the impact on d_1 from changes in the variance of the bank's equity return. d_1 tells us how many standard deviation of the natural logarithm of the V and Z ratio needs to deviate from its mean value. In our model, the sign of the term $\partial d_1 / \partial \hat{\sigma}^2$ depends on the value of d_1 . $\partial d_1 / \partial \hat{\sigma}^2 = 0$ if $d_1 = 1/2$. If d_1 is less (greater) than $1/2$, $\partial d_1 / \partial \hat{\sigma}^2$ is positive (negative). Hence, when $d_1 < (>) 1/2$, the bank faces a small (large) number of deviations from the mean value, and thus a less (more) risky state of the world. $d_1 = 1/2$ serves as the benchmark case. This suggests a way to study the effect of volatility on the risk adjustment factor of risky-asset repayments. We note that the risky elasticity effect discussed previously reveals the bank's risk magnitude for the market value of equity return under the option-based valuation. The risky elasticity effect can be interpreted as a total effect that includes both the risky-asset and net-obligation adjustment factors, while the term $\partial d_1 / \partial \hat{\sigma}^2$ can be interpreted as a partial effect limited in our model to the risky-asset adjustment factor.

Third, applying Bulow, Geanakoplos, and Klemperer (1985), we define the term $\partial^2 I / \partial R_L \partial R_C$ as the strategic substitutes if negative, or the strategic complements if positive. With the strategic substitute (the strategic complement), the bank responds to fluctuations in the commitment rate by adjusting its optimal marginal equity return of loan rate. Specifically, the bank's responds to more aggressive adjustment of its commitment rate by a less (more) aggressive adjustment of its optimal marginal equity return of loan rate. The explanation of $\partial^2 I / \partial R_C \partial R_L$ follows a similar argument as $\partial^2 I / \partial R_L \partial R_C$ discussed previously. Note that our application provides an explanation of banking firm rate-adjustment behavior, rather than the firm price-setting game or competition behavior described by Bulow, Geanakoplos, and Klemperer (1985).

The results of equations (11) and (12) are written as follows.

Proposition 1: With strategic complements, an increase in the variance of the bank's equity return increases the optimal loan rate and the optimal commitment rate when $b_1 > (<) b_2$ and $d_1 > (<) 1/2$.

The results of Proposition 1 owe to the impact on risk elasticity of a change in variance of the bank's equity return. If the bank faces an increasing magnitude of risk in its equity return ($b_1 > b_2$) and a large number of deviations from the mean value ($d_1 > 1/2$), the impact effect stated above is positive. If the bank faces a decreasing magnitude of risk for its equity return ($b_1 < b_2$) and a small number of deviations from the mean value ($d_1 < 1/2$), the impact effect is again positive. Under the circumstances, both conditions reflect the ceteris paribus assumption that an increase in the variance of the bank's equity return increases its risk magnitude. In the valuation model described in equations (9) and (10), as well as in Merton (1973), volatility stems from the instantaneous correlation between risky assets and net obligations. When risky assets and default-free liquid assets are positively correlated, as would be expected, the volatility of the risky assets is partially offset by volatility of the default-free liquid assets. The comparative static results of equations (11) and (12) show that with strategic complements, the bank's optimal loan rate (and thus the optimal interest margin) and commitment rate increase with volatility. Mercer (1992) demonstrates that earnings from the margin account significantly for bank profits. Crouhy and Galai (1991) show that the value of equity increases with volatility. Thus, Proposition 1 provides an alternative explanation of this result.

It is important to further note that the decision process occurs two stages. In the second stage, the risk policy is held fixed and interest rates are chosen. As the risk is held fixed, the bank is pre-committed to an aggressive stance in the lending market. The solution is quite different

from a simultaneous maximization for both variables. In that case, the bank would possess no information on the chosen risk policies and thus would not be able to riskily pre-commit to an aggressive interest rate strategy. In a two-stage model, the information structure of the bank is different from that of a single stage maximization. Consequently, the equilibrium interest rates and risk policy are different under each assumption. We now solve the risk stage of the game.

A bank's portfolio objective is to maximize its equity return in anticipation of the resolution of the interest rate stage. In choosing its risk level, the bank takes into account its effect on the interest rate decisions since both the optimal loan rate and the optimal commitment rate here affect the level of equity return risk. The risk level chosen by the bank maximizes its equity return along the first order conditions of equations (9) and (10). By the assumption of the unique market equilibrium, we know $R_L(\hat{\sigma}^2)$ and $R_C(\hat{\sigma}^2)$ completely characterize the interest rate equilibrium as a function of the variance of the equity return. This new objective function for the bank incorporates its rate-setting optimizing behavior as it forces the bank to take into account its rate-setting reaction. This also guarantees that we can find a sequential equilibrium of the game.

We now solve the following maximization problem:

$$\text{Max}_{\hat{\sigma}^2} J(R_L(\hat{\sigma}^2), R_C(\hat{\sigma}^2), \hat{\sigma}^2) \quad (13)$$

where $J(\cdot)$ is defined in equation (4). Given the conditions of equations (9) and (10), the first order condition for the maximization is:

$$\frac{\partial J}{\partial \hat{\sigma}^2} = \frac{\partial V(R_L(\hat{\sigma}^2), R_C(\hat{\sigma}^2), \hat{\sigma}^2)}{\partial \hat{\sigma}^2} N(d_1) - \frac{\partial Z(R_L(\hat{\sigma}^2), R_C(\hat{\sigma}^2), \hat{\sigma}^2)}{\partial \hat{\sigma}^2} e^{-\delta} N(d_2) = 0 \quad (14)$$

We require that the second order condition be satisfied, that is, $\partial^2 J / \partial (\hat{\sigma}^2)^2 < 0$. In equation (14), the term associated with $N(d_1)$ represents the marginal risk-adjusted risky-asset repayments of volatility, and the term associated with $N(d_2)$ represents the marginal risk-

adjusted net-obligation payments of volatility. The equilibrium condition of equation (14) demonstrates that both the positive marginal values of volatility are equal (see Appendix 3).

We consider next the impacts on the volatility of the bank's equity return from changes in the degree of corporate governance and the degree of information asymmetry. By totally differentiating equation (14) for g and α , we reach the following comparative static results.

$$\frac{\partial \hat{\sigma}^2}{\partial g} = -\left[\frac{\partial^2 V}{\partial \hat{\sigma}^2 \partial g} N(d_1) - \frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial g} e^{-\delta} N(d_2) \right. \\ \left. + \frac{\partial V}{\partial \hat{\sigma}^2} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial g} \right] / \frac{\partial^2 S}{\partial (\hat{\sigma}^2)^2} \quad (15)$$

$$\frac{\partial \hat{\sigma}^2}{\partial \alpha} = -\left[\frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial \alpha} e^{-\delta} N(d_2) \right. \\ \left. + \frac{\partial V}{\partial \hat{\sigma}^2} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial \alpha} \right] / \frac{\partial^2 S}{\partial (\hat{\sigma}^2)^2} \quad (16)$$

The results of equations (15) and (16) are stated in the following propositions (see Appendix 4).

Proposition 2: When a bank faces less risk, an increase in the degree of corporate governance decreases the variance of the bank's equity return.

The result of Proposition 2 can be explained in the way that commitment providing and external financing help governance influence the distribution of return. First, the term $\partial^2 V / \partial \hat{\sigma}^2 \partial g$ in equation (15) represents how a change in the degree of corporate governance impacts the volatility of the bank's marginal risky-asset repayments. The sign of this marginal term is determined by the relationship between C and g , as well as by how a change in $\hat{\sigma}^2$

affects R_c . This term is negative in sign since $\partial C/\partial g < 0$ and $\partial R_c/\partial \hat{\sigma}^2 > 0$. Second, the term $\partial^2 Z/\partial \hat{\sigma}^2 \partial g$ in equation (15) represents how a change in the degree of corporate governance impacts the volatility of the bank's marginal net-obligation payments. This positive term is primarily explained by $\partial C/\partial g$ and $\partial K_1/\partial g$ (see equation (A4-2) in Appendix 4). As a result, an increase in governance degree negatively impacts the volatility of the bank's equity return.

The intuition is very straightforward. The bank becomes relatively conservative when operating under strong governance. In particular, a bank with strong monitoring will decrease the volatility of its marginal risky-asset repayments increase the volatility of its marginal net-obligation payments. The bank's depositors may not benefit from this monitoring, at the expense of the shareholders, since the bank with strong monitoring decreases the volatility of its equity return and the optimal margin. Thus, even though our results supports Cremers and Nair's (2005) findings, strong monitoring may discourage the provision of liquidity.

Proposition 3: Under heightened risk, an increase in the degree of the capital market imperfection decreases the variance of the bank's equity return.

The term $\partial^2 Z/\partial \hat{\sigma}^2 \partial \alpha$ in equation (16) represents the impact of a change in information asymmetry on the volatility of a bank's marginal net-obligation payments. That this term is positive is primarily explained by $\partial K_1/\partial \alpha$ (see equation (A4-4) in Appendix 4). As a result, the volatility of the bank's equity return from an increase in the information asymmetry degree is negative when the bank faces greater risk. The bank with higher information asymmetry is more likely to exploit new investors and hence decreases the volatility of its equity return. As pointed out by Ferreira and Laux (2007), abundant research establishes the close relationship between volatility and information flow. In particular, our finding supports Durnev, Morck, and Yeung

(2004): high levels of volatility are associated with more efficient capital allocation or with less capital market imperfection.

The bank maximizes its equity return in the first stage of risk by anticipating the resolution of the second stage of rate determinations. Banks take into account the effect of loan rate and commitment rate on equity return. Consequently, changes in the degree of the corporate governance and capital market imperfection sequentially impact a bank's loan rate. These sequential changes in the bank's loan rate from changes in g and α can be given by

$$\frac{dR_L}{dg} = \frac{\partial R_L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial g} \quad (17)$$

$$\frac{dR_L}{d\alpha} = \frac{\partial R_L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial \alpha} \quad (18)$$

The results of equations (17) and (18) are stated in the following proposition.

Proposition 4: With strategic complements, an increase in the degree of the corporate governance (the information asymmetry) decreases the optimal loan rate of a bank facing heightened risk.

The equation (17) is negative in sign since the positive sign of the first term on the right-hand side is determined by how changes in volatility affect the bank's optimal loan rate in the second stage (see Proposition 1), while the negative sign of the second term is determined by how changes in the degree of the corporate governance affect the volatility of the bank's equity return in the first stage (see Proposition 3). As stated earlier, a lower loan rate implies a lower bank margin. This sequential result demonstrates that governance influences bank margin or bank profit. Intuitively, the bank with strong monitoring must now provide a return to a less

volatile state. One way the bank may attempt to adjust its total return is by shifting its investments to its loan portfolio and away from the liquid-asset market. If loan demand is relatively rate-elastic, a larger loan portfolio is possible at a reduced margin under conditions of diminished risk.

Equation (18) demonstrates that an increase in the information asymmetry degree decreases the volatility of the bank's equity return, and consequently decreases the bank's optimal loan rate. This result may be interpreted similarly to that of a change in g . Basically, increases in the information asymmetry degree encourage the bank to provide a return to a less volatile state, and consequently encourage a bank facing higher risk to shift investment from liquid assets to its loan portfolio at a reduced loan rate.

We further demonstrate that the sequential changes in the bank's loan commitment rate from changes in g and α as follows.

$$\frac{dR_c}{dg} = \frac{\partial R_c}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial g} \quad (19)$$

$$\frac{dR_c}{d\alpha} = \frac{\partial R_c}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial \alpha} \quad (20)$$

The results of equations (19) and (20) are stated in the following proposition.

Proposition 5: With strategic complements, an increase in the degree of corporate governance (information asymmetry) decreases the commitment rate of a bank facing conditions of diminished (heightened) risk.

By taking the relevant partial derivatives, it can be shown that the commitment rate is a function of the degrees of corporate governance and of information asymmetry. The interpretations of these results resemble the explanation of loan rate stated in Proposition 4.

Solutions and Results: Portfolio-Theoretic Approach

In this section, we solve a banking portfolio problem. The solutions derived here assume a setting in which the bank's risk is chosen to maximize the market value of equity return in the risk stage, and that decision's effect on the subsequent rate-setting stage. Formally, the bank solves the following optimization problem:

$$\text{Max}_{\hat{\sigma}^2} I(R_L, R_C, \hat{\sigma}^2) \quad (21)$$

Partially differentiating equation (21) with respect to $\hat{\sigma}^2$, the first order condition is given by

$$\frac{\partial I}{\partial \hat{\sigma}^2} = \frac{\partial V(R_L, R_C, \hat{\sigma}^2)}{\partial \hat{\sigma}^2} N(d_1) - \frac{\partial Z(R_L, R_C, \hat{\sigma}^2)}{\partial \hat{\sigma}^2} e^{-\delta} N(d_2) = 0 \quad (22)$$

Equation (22) determines the optimal variance level of the bank's equity return. A sufficient condition for an optimum result is that $\partial^2 I / \partial (\hat{\sigma}^2)^2 < 0$. This condition implies that equation (22) characterizes a unique optimal variance in response to its loan rate and commitment rate decisions. Solving for the equilibrium variance as a function of the two interest rates yields the mapping, $\hat{\sigma}^2(R_L, R_C)$. The mapping characterizes the variance of the bank's equity return as a function of the loan rate and the commitment rate. The assumption of unique equilibrium guarantees that the mapping exists. This is used in the computation of the equilibrium in the first stage of the banking firm problem. In equation (22), the term associated with $N(d_1)$ represents the marginal risk-adjusted risky-asset repayments of variance, and the term associated with $N(d_2)$ represents the marginal risk-adjusted net-obligation payments of

variance. The equilibrium condition of equation (22) implies that the positive marginal values of variance are equal (see Appendix 5).

We consider next the impact of changes in the loan rate and the commitment rate on the variance of the bank's equity return. Implicit differentiation of equation (22) with respect to R_L and R_C yields (see Appendix 6):

$$\frac{\partial \hat{\sigma}^2}{\partial R_L} = -\left[\frac{\partial^2 V}{\partial \hat{\sigma}^2 \partial R_L} N(d_1) - \frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial R_L} e^{-\delta} N(d_2) \right. \\ \left. + \frac{\partial V}{\partial \hat{\sigma}^2} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial R_L} \right] / \frac{\partial^2 S}{\partial (\hat{\sigma}^2)^2} \quad (23)$$

$$\frac{\partial \hat{\sigma}^2}{\partial R_C} = -\left[\frac{\partial^2 V}{\partial \hat{\sigma}^2 \partial R_C} N(d_1) - \frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial R_C} e^{-\delta} N(d_2) \right. \\ \left. + \frac{\partial V}{\partial \hat{\sigma}^2} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial R_C} \right] / \frac{\partial^2 S}{\partial (\hat{\sigma}^2)^2} \quad (24)$$

The results of equations (23) and (24) are stated in the following proposition.

Proposition 6: An increase in the loan rate or the commitment rate increases the variance of equity return of a bank facing diminished risk.

The comparative static results in Proposition 6 show that the volatility of the bank's equity return increases with loan rate and commitment rate. As stated previously, a higher loan rate or commitment rate implies a higher bank margin (and thus bank equity return). One way the bank may attempt to augment its return is by shifting its investments to its liquid assets and away from the loan (commitment) portfolio at an increased loan rate (commitment rate), and accordingly

increasing the volatility of the bank's equity return. This is a result of the Markowitz-Tobin portfolio theory. Edwards (1977) argues that interest rates are higher in monopolistic banking markets. As shown in Proposition 6, it is possible for a monopolistic bank to increase risky-asset interest rates, resulting in increasing risk through a diminished scale of operation. In this case, we argue that the indirect evidence of a positive relation between risk and interest rate is consistent with portfolio theory. This is result of the Markowitz-Tobin portfolio theory.

In the following section, the bank maximizes its equity return by anticipating the resolution of the risk stage above. In choosing interest rate levels that will maximize equity rate, the bank takes into account the effect of the risk decision on the loan rate and commitment rate, as per the first order condition of equation (22). As stated previously, by the condition of $\partial^2 I / \partial (\hat{\sigma}^2)^2 < 0$, we know $\hat{\sigma}^2(R_L, R_C)$ completely characterizes the risk equilibrium as a function of loan rate and commitment rate. The bank now solves the following sequential maximization problem:

$$\underset{R_L, R_C}{\text{Max}} M(R_L, R_C, \hat{\sigma}^2(R_L, R_C)) \quad (25)$$

where $M(\cdot)$ is defined in equation (4). Given the condition of equation (22), the first order conditions for the maximization problem are (see Appendix 7):

$$\frac{\partial M}{\partial R_L} = \frac{\partial V(R_L, R_C, \hat{\sigma}^2(R_L, R_C))}{\partial R_L} N(d_1) - \frac{\partial Z(R_L, R_C, \hat{\sigma}^2(R_L, R_C))}{\partial R_L} e^{-\delta} N(d_2) = 0 \quad (26)$$

$$\frac{\partial M}{\partial R_C} = \frac{\partial V(R_L, R_C, \hat{\sigma}^2(R_L, R_C))}{\partial R_C} N(d_1) - \frac{\partial Z(R_L, R_C, \hat{\sigma}^2(R_L, R_C))}{\partial R_C} e^{-\delta} N(d_2) = 0 \quad (27)$$

The second order conditions and the unique market equilibrium are assumed to be

$$\partial^2 M / \partial R_L \partial R_C < 0, \partial^2 M / \partial R_C \partial R_L < 0, \text{ and}$$

$$\Delta_M = (\partial^2 M / \partial R_L^2)(\partial^2 M / \partial R_C^2) - (\partial^2 M / \partial R_L \partial R_C)(\partial^2 M / \partial R_C \partial R_L) > 0.$$

We consider next the impacts on the bank's loan rate and commitment rate from changes in the degree of corporate governance and the degree of information asymmetry. These comparative static results may be derived by totally differentiating equations (26) and (27), then solving for these effects using Cramer's rule. We have the following results.

$$\frac{\partial R_L}{\partial g} = -\left(\frac{\partial^2 M}{\partial R_L \partial g} \frac{\partial^2 M}{\partial R_C^2} - \frac{\partial^2 M}{\partial R_L \partial R_C} \frac{\partial^2 M}{\partial R_C \partial g}\right) / \Delta_M \quad (28)$$

$$\frac{\partial R_C}{\partial g} = -\left(\frac{\partial^2 M}{\partial R_L^2} \frac{\partial^2 M}{\partial R_C \partial g} - \frac{\partial^2 M}{\partial R_L \partial g} \frac{\partial^2 M}{\partial R_C \partial R_L}\right) / \Delta_M \quad (29)$$

$$\frac{\partial R_L}{\partial \alpha} = -\left(\frac{\partial^2 M}{\partial R_L \partial \alpha} \frac{\partial^2 M}{\partial R_C^2} - \frac{\partial^2 M}{\partial R_L \partial R_C} \frac{\partial^2 M}{\partial R_C \partial \alpha}\right) / \Delta_M \quad (30)$$

$$\frac{\partial R_C}{\partial \alpha} = -\left(\frac{\partial^2 M}{\partial R_L^2} \frac{\partial^2 M}{\partial R_C \partial \alpha} - \frac{\partial^2 M}{\partial R_L \partial \alpha} \frac{\partial^2 M}{\partial R_C \partial R_L}\right) / \Delta_M \quad (31)$$

The results of equations (28) and (29) are stated in the following proposition (see Appendix 8).

Proposition 7: With strategic complements, an increase in the degree of the corporate governance increases the loan rate and commitment rate of a bank facing diminished risk.

As a bank faces a high level of monitoring, it must operate conservatively by providing a return to a larger equity base. One possible way the bank may attempt to do so is by shifting its investments to default-free liquid assets and away from the risky-asset portfolio at an increased margin. This result is consistent with the empirical findings of Cremers and Nair (2005) that bank interest margin is positively related to corporate governance. To the extent that an increase in the margin reflects an increase in equity return, our results imply a positive relationship between corporate governance and bank equity return. Thus, corporate governance is encouraged by the shareholders if the bank adopts the portfolio-theoretic approach as its analytical apparatus. As mentioned previously in Proposition 2, however, corporate governance is discouraged if the bank adopts the firm-theoretic approach as its analytical apparatus. If there is a banking portfolio problem, a forced switch to a banking firm problem could lead to inefficiency. The results of equation (30) and (31) are stated in the following proposition.

Proposition 8: An increase in the degree of capital market imperfection decreases the loan rate and commitment rate of a bank facing diminished risk.

The potential for adverse selection in the capital market perhaps implies that the bank has gained some inside information as to the quality of its risky-asset portfolio (Kashyap, Rajan, and Stein (2002)). The bank then could use this information to exploit new investment. To do this, the bank may make use of the gain of inside information to increase its risky-asset investment by reducing loan rate or commitment rate (and hence bank equity return). Our results imply a negative relationship between information asymmetry and bank equity return.

Following an interpretation similar to those of changes in g and α in equations (17) and (18), we present these sequential changes in the volatility of the bank's equity return from changes in g and α as follows.

$$\frac{d\hat{\sigma}^2}{dg} = \frac{\partial\hat{\sigma}^2}{\partial R_L} \frac{\partial R_L}{\partial g} = \frac{\partial\hat{\sigma}^2}{\partial R_C} \frac{\partial R_C}{\partial g} > 0 \quad (32)$$

$$\frac{d\hat{\sigma}^2}{d\alpha} = \frac{\partial\hat{\sigma}^2}{\partial R_L} \frac{\partial R_L}{\partial \alpha} = \frac{\partial\hat{\sigma}^2}{\partial R_C} \frac{\partial R_C}{\partial \alpha} < 0 \quad (33)$$

The results of equations (32) and (33) are stated in the following proposition.

Proposition 9: With strategic complements, an increase in the degree of the corporate governance (the information asymmetry) increases (decreases) the variance of the equity return of a bank facing diminished risk.

Equation (32) demonstrates the total change in the variance of the bank's equity return from a change in the degree of the corporate governance. This total change is positive, since the impact on the loan rate (the commitment rate) from a change in the degree of the corporate governance (Proposition 7) is positive, and the impact on the variance of the bank's equity return from a change in the loan rate (the commitment rate) is positive as well (Proposition 6.) As the bank faces strong governance, it must provide less liquidity to its equity base. One way the bank may attempt to do so is by shifting its investments to liquid assets and away from risky assets at an increased loan rate or commitment rate. An increased loan rate or commitment rate implies an increased interest margin, reflecting an increased equity return. Given that the variance of the bank's equity return is an increasing function of the loan rate and the commitment rate, an increase in the loan rate or the commitment rate increases the risk of bank return. Our results imply that strong governance increases bank risk. Thus, we argue that corporate governance is discouraged in risk management of the banking portfolio problem.

An increase in the degree of information asymmetry reduces the value and variance of the

bank's equity return. The result follows from an interpretation similar to that of a change in the degree of the corporate governance. Basically, increases in the degree of the information asymmetry encourage the bank to shift investments to its risky-asset portfolio from other earning assets, such as liquid assets. In imperfect loan and commitment markets, the bank must reduce the size of the margin in order to increase the amount of loans and commitments. Further, a decrease in the margin will result in decreasing variance of the bank's equity return. Our results imply a negative relationship between equity quality and information asymmetry.

Conclusion

Two divergent approaches have been employed in the literature to model the financial intermediary. In the firm-theoretic approach, we show that a higher risk of equity return leads to higher interest rate-setting (and thus to a higher interest margin). In the portfolio-theoretic approach, we demonstrate that a higher interest margin set by the bank would lead to higher risk of equity return. However, the question of whether or not bank interest margin is determined prior to bank risk has far-reaching implications.

On the one hand, a firm-theoretic approach suggests that interest rate determination is considered prior to risk, and thus that the comparative static properties of the model should be investigated to determine the influence of risk on interest margin. According to sequential equilibrium, we should next consider the impact of changes in corporate governance and information asymmetry on bank risk. Thus, we can show that risk is the primary mechanism linking corporate governance and information asymmetry to bank interest margin determination.

Conversely, the portfolio-theoretic approach investigates the comparative static results to determine the influence of interest on risk. We show that the interest rate margin is the primary mechanism linking corporate governance and information asymmetry to bank risk taking. Large

inefficiencies could result from a forced switch between the firm-theoretic approach, which considers interest margin prior to risk, and the portfolio-theoretic approach, which considers risk prior to the interest rate margin.

The finance literature emphasizes the impact of corporate governance and information asymmetry on bank margin and risk in liquidity provision. Our contribution is to model two alternative approaches in which corporate governance and information asymmetry influence bank interest margin through risk taking (the firm-theoretic approach) and bank risk through interest margin determination (the portfolio-theoretic approach.)

More specifically, we find that in the firm-theoretic approach, the risk of the bank's equity return is negatively related to the degree of corporate governance, and to the degree of information asymmetry. However, in the portfolio-theoretic approach, the risk of the bank's equity return is positively related to the degree of corporate governance, and negatively related to the degree of information asymmetry through the bank's interest margin determination. We also find that in the portfolio-theoretic approach, the bank interest margin is positively related to the degree of corporate governance, and negatively related to the degree of information asymmetry. However, in the firm-theoretic approach, the bank interest margin is negatively related to the degree of corporate governance, as well as to the degree of information asymmetry through its risk taking.

One immediate application of this paper is to evaluate how corporate governance and information asymmetry create risk and profit arrangements that in turn lead to different approaches to liquidity provision. One intriguing result is that different approaches to managing liquidity provision, respectively emphasizing risk and profit, are possible. We show that the nature of a bank's approach adoption is crucial in determining how corporate governance and

information asymmetry influence risk and profit. Our findings provide two alternative approaches to answer the question whether bank profit is considered prior to its risk or bank risk is considered prior to its profit. However, we argue that bank managers may think it natural and obvious that corporate governance and information asymmetry sequentially influence returns and risks. Whether those parameters influence risks and sequentially their returns because managers may think it natural to do so or for reasons of analytical convenience, we do not know. It may be possible to construct models to endogenize the effect of the choice between the two alternatives above. Such concerns are beyond the scope of this paper and so are not addressed here. What this paper does demonstrate, however, is the impact of banks' behavioral mode on returns and risks.

Appendices

Appendix 1.

In equation (9), we have

$$\frac{\partial V(R_L, R_C, \hat{\sigma}^2)}{\partial R_L} = L + (1 + R_L) \frac{\partial L}{\partial R_L} < 0 \quad (\text{A1-1})$$

$$\begin{aligned} \frac{\partial Z(R_L, R_C, \hat{\sigma}^2)}{\partial R_L} &= [-R_F K_0 + (1 + R - \tau)K_0 + (1 + R)(K_0 + K_1)] \frac{q'}{q^2} \frac{\partial L}{\partial R_L} \\ &+ [(1 + R - \tau) + (1 + R)] \frac{\partial L}{\partial R_L} < 0 \quad (\text{A1-2}) \end{aligned}$$

$\partial V / \partial R_L$ is the reciprocal of the loan rate elasticity of loan demand evaluated at the optimal loan rate. This elasticity is negative in sign, since the bank will operate on the elastic portion of

its loan demand curve, as demonstrated by $\partial L / \partial R_L < 0$. Based on the first order condition, the term $\partial Z / \partial R_L$ is negative as well. Accordingly, $-R_F K_0 + (1 + R - \tau)K_0 + (1 + R)(K_0 + K_1)$ is positive.

Appendix 2.

In equation (10), we have

$$\frac{\partial V(R_L, R_C, \hat{\sigma}^2)}{\partial R_C} = C + (1 + R_C) \frac{\partial C}{\partial R_C} < 0 \quad (\text{A2-1})$$

$$\begin{aligned} \frac{\partial Z(R_L, R_C, \hat{\sigma}^2)}{\partial R_C} &= [-R_F K_0 + (1 + R - \tau)K_0 + (1 + R)(K_0 + K_1)] \frac{q'}{q^2} \frac{\partial C}{\partial R_C} \\ &+ (1 + R) \frac{\partial C}{\partial R_C} < 0 \quad (\text{A2-2}) \end{aligned}$$

The term $\partial V / \partial R_C$ is reciprocal to the commitment rate elasticity of commitment demand, evaluated at the optimal commitment rate. This elasticity of demand is negative, and $\partial Z / \partial R_C < 0$ based on the first order condition.

Appendix 3.

In equation (14), we have

$$\frac{\partial V(R_L(\hat{\sigma}^2), R_C(\hat{\sigma}^2), \hat{\sigma}^2)}{\partial \hat{\sigma}^2} = \{ [L + (1 + R_L) \frac{\partial L}{\partial R_L}] \frac{\partial R_L}{\partial \hat{\sigma}^2} + (1 + R_L) \frac{\partial L}{\partial \hat{\sigma}^2} \}$$

$$+ \{ [C + (1 + R_c) \frac{\partial C}{\partial R_c}] \frac{\partial R_c}{\partial \hat{\sigma}^2} + (1 + R_c) \frac{\partial C}{\partial \hat{\sigma}^2} \} \quad (\text{A3-1})$$

$$\begin{aligned} & \frac{\partial Z(R_L(\hat{\sigma}^2), R_c(\hat{\sigma}^2), \hat{\sigma}^2)}{\partial \hat{\sigma}^2} \\ &= [-R_F + (1 + R - \tau) + (1 + R)] \frac{K_0 q'}{q^2} \left(\frac{\partial L}{\partial R_L} \frac{\partial R_L}{\partial \hat{\sigma}^2} + \frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial R_c} \frac{\partial R_c}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right) \\ &+ (1 + R - \tau) \left(\frac{\partial L}{\partial R_L} \frac{\partial R_L}{\partial \hat{\sigma}^2} + \frac{\partial L}{\partial \hat{\sigma}^2} \right) \\ &+ (1 + R) \left(\frac{K_1 q'}{q^2} + 1 \right) \left(\frac{\partial L}{\partial R_L} \frac{\partial R_L}{\partial \hat{\sigma}^2} + \frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial R_c} \frac{\partial R_c}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right) \quad (\text{A3-2}) \end{aligned}$$

The term $\partial V / \partial \hat{\sigma}^2$ in equation (A3-1) represents the volatility of marginal risky-asset repayments. The first term on the right-side of equation (A3-1) can be interpreted as the volatility of marginal loan repayments, while the second term can be interpreted as the volatility of marginal commitment repayments. Further, the first term of the marginal loan repayments can be treated as the indirect effect, while the second term can be treated as the direct effect. The indirect effect is negative since $\partial R_L / \partial \hat{\sigma}^2 > 0$ (Proposition 1), and the direct effect is positive. In general, it is reasonable to believe that the direct effect is partially offset by the indirect effect. Thus, the volatility of marginal loan repayments is positive. Similarly, the volatility of marginal commitment repayments is positive as well. Accordingly, $\partial V / \partial \hat{\sigma}^2 > 0$.

The term $\partial Z / \partial \hat{\sigma}^2$ in equation (A3-2) represents the volatility of marginal net-obligation payments. The first term in equation (A3-2) is the impact on the bank's deposit payments from changes in the volatility. This term is positive since the positive direct effect ($\partial L / \partial \hat{\sigma}^2$ and

$\partial C / \partial \hat{\sigma}^2$) is partially offset by the negative indirect effect $((\partial L / \partial R_L)(\partial R_L / \partial \hat{\sigma}^2))$ and $(\partial C / \partial R_C)(\partial R_C / \partial \hat{\sigma}^2)$. The second and third terms are the impacts of changes in the volatility on the bank's liquid-asset payments at date 1 and date 2, respectively. Both terms are positive. Thus, $\partial Z / \partial \hat{\sigma}^2 > 0$.

Appendix 4.

In equation (15), we have

$$\frac{\partial^2 V}{\partial \hat{\sigma}^2 \partial g} = \frac{\partial C}{\partial g} \frac{\partial R_C}{\partial \hat{\sigma}^2} < 0 \quad (\text{A4-1})$$

$$\begin{aligned} \frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial g} = & -[-R_F + (1+R-\tau) + (1+R)] \frac{2K_0(q')^2}{q^3} \frac{\partial C}{\partial g} \\ & + (1+R) \left[\frac{\partial K_1}{\partial g} \frac{q'}{q^2} \left(\frac{\partial L}{\partial R_L} \frac{\partial R_L}{\partial \hat{\sigma}^2} + \frac{\partial L}{\partial \hat{\sigma}^2} \right) + \frac{\partial C}{\partial R_C} \frac{\partial R_C}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right] \frac{2K_1 q'}{q^3} \frac{\partial C}{\partial g} > 0 \quad (\text{A4-2}) \end{aligned}$$

$$\frac{\partial d_1}{\partial g} = \frac{1}{\hat{\sigma} V} \left(\frac{\partial V}{\partial g} - \frac{V}{Z} \frac{\partial Z}{\partial g} \right) \quad (\text{A4-3})$$

The term $(\partial V / \partial g) - (V / Z)(\partial Z / \partial g)$ in equation (A4-3) can be defined as the corporate governance elasticity effect. The sign of this effect is equivalent to the sign of the difference between the corporate governance elasticity of risky-asset repayments, $(g / V)(\partial V / \partial g)$, and the corporate governance elasticity of net-obligation payments, $(g / Z)(\partial Z / \partial g)$. This difference demonstrates the corporate governance magnitude for the value of the bank's equity return. Based on a general assumption, it is reasonable to believe that the corporate governance

elasticity effect is negative, since $\partial V / \partial g < 0$, at least in the short run. Thus, $\partial d_1 / \partial g < 0$. Given the conditions of equation (A4-1), (A4-2), and (A4-3), $\partial \hat{\sigma}^2 / \partial g < 0$ when the bank faces diminished risk.

In equation (16), we have

$$\frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial \alpha} = (1+R) \frac{\partial K_1}{\partial \alpha} \frac{q'}{q^2} \left(\frac{\partial L}{\partial R_L} \frac{\partial R_L}{\partial \hat{\sigma}^2} + \frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial R_C} \frac{\partial R_C}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right) > 0 \quad (\text{A4-4})$$

$$\frac{\partial d_1}{\partial \alpha} = \frac{1}{\hat{\sigma} Z} \frac{(1+R)}{g} \frac{\partial K_1}{\partial \alpha} > 0 \quad (\text{A4-5})$$

Given the conditions of equations (A4-4) and (A4-5), $\partial \hat{\sigma}^2 / \partial \alpha < 0$ when the bank faces diminished risk.

Appendix 5.

In equation (22), we have

$$\frac{\partial V}{\partial \hat{\sigma}^2} = (1+R_L) \frac{\partial L}{\partial \hat{\sigma}^2} + (1+R_C) \frac{\partial C}{\partial \hat{\sigma}^2} > 0 \quad (\text{A5-1})$$

$$\frac{\partial Z}{\partial \hat{\sigma}^2} = [-R_F K_0 + (1+R-\tau)K_0 + (1+R)(K_0 + K_1)] \frac{q'}{q^2} \left(\frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right)$$

$$= [-R_F K_0 + (1+R-\tau)K_0 + (1+R)(K_0 + K_1)] \frac{q'}{q^2} \left(\frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right)$$

$$+ [(1+R-\tau) + (1+R)] \frac{\partial L}{\partial \hat{\sigma}^2} + (1+R) \frac{\partial C}{\partial \hat{\sigma}^2} > 0 \quad (\text{A5-2})$$

The term $\partial V / \partial \hat{\sigma}^2 > 0$ since $\partial L / \partial \hat{\sigma}^2 > 0$ and $\partial C / \partial \hat{\sigma}^2 > 0$. In addition, based on the first

order condition, the term $\partial Z / \partial \hat{\sigma}^2 > 0$.

Appendix 6.

In equation (23), the three terms are expressed in the following:

$$\frac{\partial^2 V}{\partial \hat{\sigma}^2 \partial R_L} = \frac{\partial L}{\partial \hat{\sigma}^2} > 0 \quad (\text{A6-1})$$

$$\begin{aligned} & \frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial R_L} \\ &= -[-R_F K_0 + (1 + R - \tau)K_0 + (1 + R)(K_0 + K_1)] \frac{2(q')^2}{q^3} \frac{\partial L}{\partial R_L} \left(\frac{\partial L}{\partial \hat{\sigma}^2} + \frac{\partial C}{\partial \hat{\sigma}^2} \right) > 0 \end{aligned}$$

(A6-2)

$$\frac{\partial d_1}{\partial R_L} = \frac{1}{\hat{\sigma} V} \left(\frac{\partial V}{\partial R_L} - \frac{V}{Z} \frac{\partial Z}{\partial R_L} \right) \quad (\text{A6-3})$$

It can be reasonably demonstrated that the impact on the volatility of marginal risk-adjusted risky-asset repayments from a change in loan rate ($\partial^2 V / \partial \hat{\sigma}^2 \partial R_L$ in equation (A6-1)) is more significant than the impact on the volatility of marginal risk-adjusted net-obligation payments from a change in loan rate ($\partial^2 Z / \partial \hat{\sigma}^2 \partial R_L$ in equation (A6-2)). Thus, the difference between these two marginal values is positive since $\partial^2 V / \partial \hat{\sigma}^2 \partial R_L > 0$.

The interpretation of the term $(\partial V / \partial R_L) - (V / Z)(\partial Z / \partial R_L)$ in equation (A6-3) parallels that of a change in g (see equation (A4-3) in Appendix 4). This term can be defined as the loan rate elasticity effect. This effect is negative since $\partial V / \partial R_L < 0$. Thus $\partial d_1 / \partial R_L$ in equation (A6-3) is

negative. Given the conditions of equations (A6-1), (A6-2) and (A6-3), $\partial \hat{\sigma}^2 / \partial R_L^2 > 0$ when the risk elasticity effect is positive.

In equation (24), the three terms are stated in the following:

$$\frac{\partial^2 V}{\partial \hat{\sigma} \partial R_C} = \frac{\partial C}{\partial \hat{\sigma}^2} > 0 \quad (\text{A6-4})$$

$$\frac{\partial^2 Z}{\partial \hat{\sigma}^2 \partial R_C} = \frac{\partial^2 Z}{\partial \hat{\sigma} \partial R_L} \quad (\text{A6-5})$$

$$\frac{\partial d_1}{\partial R_C} = \frac{1}{\hat{\sigma} V} \left(\frac{\partial V}{\partial R_C} - \frac{V}{Z} \frac{\partial Z}{\partial R_C} \right) \quad (\text{A6-6})$$

Thus, the interpretation of $\partial \hat{\sigma}^2 / \partial R_C^2 > 0$ parallels that of a change in R_L .

Appendix 7.

The marginal risky-asset repayments of loan rate and the marginal net-obligation payment of loan rate in equation (26) are respectively stated as follows.

$$\frac{\partial V}{\partial R_L} = [L + (1 + R_L) \frac{\partial L}{\partial R_L}] + [(1 + R_L) \left(\frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} \right) + (1 + R_C) \left(\frac{\partial C}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} \right)] \quad (\text{A7-1})$$

$$\begin{aligned} \frac{\partial Z}{\partial R_L} = & [-R_F + (1 + R - \tau) + (1 + R)] \frac{K_0 q'}{q^2} \left(\frac{\partial L}{\partial R_L} + \frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} + \frac{\partial C}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} \right) \\ & + (1 + R - \tau) \left(\frac{\partial L}{\partial R_L} + \frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} \right) \end{aligned}$$

$$+ (1 + R)\left(\frac{K_1 q'}{q^2} + 1\right)\left(\frac{\partial L}{\partial R_L} + \frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} + \frac{\partial C}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L}\right) \quad (\text{A7-2})$$

The first term on the right-hand side of equation (A7-1) can be interpreted as the direct effect, while the second term can be interpreted as the indirect effect. In general, this direct effect is partially offset by the indirect effect. Thus, $\partial V / \partial R_L < 0$ since the direct effect is negative. In equation (A7-2), $\partial L / \partial R_L$ can be treated as the direct effect, while $(\partial L / \partial \hat{\sigma}^2)(\partial \hat{\sigma}^2 / \partial R_L) + (\partial C / \partial \hat{\sigma}^2)(\partial \hat{\sigma}^2 / \partial R_L)$ can be treated as indirect effect. Thus, $\partial Z / \partial R_L < 0$ since $\partial L / \partial R_L < 0$.

The two terms, $\partial V / \partial R_C$ and $\partial Z / \partial R_C$, in equation (27) behave similarly in the case of a change in R_L in equation (26).

Appendix 8.

$$\frac{\partial^2 M}{\partial R_L \partial g} = -\frac{\partial^2 Z}{\partial R_L \partial g} e^{-\delta} N(d_2) + \frac{\partial V}{\partial R_L} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial g} \quad (\text{A8-1})$$

where,

$$\begin{aligned} \frac{\partial^2 Z}{\partial R_L \partial g} = & -\{[-R_F + (1 + R - \tau) + (1 + R)] \frac{2K_0 q'}{q} \frac{\partial C}{\partial g} \\ & + (1 + R) \left(\frac{\partial K_1}{\partial g} + \frac{2K_1 q'}{q} \frac{\partial C}{\partial g} \right) \} \frac{q'}{q^2} \left(\frac{\partial L}{\partial R_L} + \frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} + \frac{\partial C}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_L} \right) < 0 \end{aligned}$$

The term $\partial^2 S / \partial R_L \partial g > 0$ when the risky elasticity effect is positive.

$$\frac{\partial^2 M}{\partial R_c \partial g} = \frac{\partial^2 V}{\partial R_c \partial g} N(d_1) - \frac{\partial^2 Z}{\partial R_c \partial g} e^{-\delta} N(d_2) + \frac{\partial V}{\partial R_c} \left(\frac{\partial N}{\partial d_1} - \frac{N(d_1)}{N(d_2)} \frac{\partial N}{\partial d_2} \right) \frac{\partial d_1}{\partial g} \quad (\text{A8-2})$$

where,

$$\frac{\partial^2 V}{\partial R_c \partial g} = \frac{\partial C}{\partial g} < 0$$

$$\frac{\partial^2 Z}{\partial R_c \partial g} = -\{[-R_f + (1 + R - \tau) + (1 + R)] \frac{2K_0 q'}{q^2} \frac{\partial C}{\partial g} + (1 + R) \left(\frac{\partial K_1}{\partial g} + \frac{2K_1 q'}{q} \frac{\partial C}{\partial g} \right) \} \frac{q'}{q^2} \left(\frac{\partial C}{\partial R_c} + \frac{\partial L}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_c} + \frac{\partial C}{\partial \hat{\sigma}^2} \frac{\partial \hat{\sigma}^2}{\partial R_c} \right) < 0$$

If the impact of a change in the degree of the corporate governance on the marginal risk-adjusted risky-asset repayments of commitment rate is less significant than its impact on the marginal risk-adjusted net-obligation payments of commitments rate, the difference between these two terms is positive, since $\partial^2 V / \partial R_c \partial g < 0$. Thus, $\partial^2 M / \partial R_c \partial g > 0$ when the risky elasticity effect is positive.

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EXPLORING SERVICE INNOVATION OF CULTURE PARKS IN TAIWAN

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Abstract

Since 1990, the development of the cultural industry has become an important international research topic. The current world trend is to make the local culture and characteristics parks to be integrated, and to apply innovative thinking to the re-packaged traditional cultural industries to promote them to the forefront of the international scene. Governments also started to pay attention to the development of cultural industries since 2000, by increasing the amount of capital investment and cultural park year by year. However, most of the current literature emphasizes the re-use of cultural parks, their management and change, but not on an analysis of innovative activities. Thus in this study, we will explore the innovative service of cultural parks in Taiwan. The purpose of this study is to have further analysis of the parks' innovative service by the method of collecting secondhand material about innovative activities held by 14 cultural parks in Taiwan. According to this study, there are three main points: first, various kinds of culture are developed according to various kinds of geographical environment; second, in Taiwan, the government has become the major resource to promote the innovative service of cultural park; third, different kinds of parks develop different kinds of innovative activities.

Key words: cultural industries, cultural park, innovation

Introduction

Since 1990, the development of the cultural industry has become an important international urban and regional development issue, including the effects of the post-industrial urban regeneration (Wynne, 1992; O'Connor, 1998), the importance of the local cultural industry for the residents (Shi- Hui Huang 2001), the importance of the attraction for people with creative ability (Florida, 2002; 2003). People in Taiwan have vigorously promoted the cultural and creative industries since 2000, so the Executive Yuan sets the "cultural and industrial development" as the main focus in the "Challenge 2008 National Development Plan," to open up the creative field, and combine human and economic development as to meet international standards of cultural and creative industries.

In Taiwan, there are thirteen kinds of industries, which make the turnover from 435.3 billion dollars in 2002 to 586.2 billion dollars in 2006, reaching 1.34 times growth and the average annual growth rate is 7.73%. The Culture Park is a regional representative of atmosphere of the time of the cultural heritage conveyed by the regional space. This area is developed under the context of cultural environment of space, and link the bases by the context of the development of history and settlements to form the concept and direction of the development of the cultural park with the aim to help residents understand the texture of local history and culture as to recognize the close relationship between environment and culture by the understanding of local history and space development to strengthen residents' concern for their living environment as to have more thinking and participation in it. For the reason of this study on the innovative activities and mechanism of the cultural park is that most of the studies of the cultural park are more in the reuse of the spare space, the management, the formation and change of the park than in the formation and the service of innovative activities.

Literature Review

The Definition of Service Innovation

According to the American Marketing Association (AMA), "service" is defined as the following: "Service means the sale or the activities, interests or satisfaction available in the course of sale or incidental to the sale of generic products." According to the opinion of Gustafsson and Johnson (2003), service innovation is not new to the world, but it is to the general business, customers or other partners. Unlike the manufacturing sector will tend to focus on business strategy and approach to their in-house R & D, service enterprises have to emphasize more on the need of innovation, organizational change and the relationship between the customer and the supplier (Tether, 2005). Service innovation is the service science drive of the achievement and arrangement of the multi-disciplinary approach, and to be compared with the final product, there is more emphasis put on the support, development and delivery of the service. (Paton and McLaughlin, 2008). Service innovation is defined as: "The different forms of service that consumers receive from some places which differs from their original recognition that is to achieve the service innovation when the organization provides the different service which consumers never experience. Even if the different services to achieve service innovation" (Gallouj, 2002). Service innovation is a collection of cooperative effort of internal management, marketing, information technology experts and other staff to develop new market needs. (Spath and Fahrlich, 2007).

Types of Service Innovation

Pim Den Hertog & Rob Bilderbeek (1999) divide service innovation into seven major types of categories: 1. Supplier-dominated Innovation. 2. Innovation with Services. 3 . Client-led Innovation 4. Innovation thought Services 5. Paradigmatic Innovation. 6. Innovation in a firm's

internalized service function 7. Innovation in an outsourced service function. Different types of service innovation, the organization has also come to play a different role. During the first to fifth class creative types, the present suppliers, service providers and customer relationships. In the sixth and seventh of the innovative type of innovation is in a unique service which may or service innovation in outsourcing.

Cultural Parks

Landry (2000) expressed the concept of the creative milieu that the gathering of the creative and talented people is the basic resource for the economy. And this kind of creative milieu means either in the building complex or in a geographical location, it should be the environment both with software and hardware facilities, and ideas along with invention are constantly being created so that the various types of community, such as the artists, managers, entrepreneurs, students and social activists, intellectuals, etc. can receive the interactive concept in such a physical place to create new things and products thus to promote economic growth; the scholar Santagata (2002) divide cultural areas into cultural industry type, body type, and the Metropolitan Museum, four kinds of culture-based SAR; That the metropolitan culture of the SAR is to use culture and art services to attract the public, create a new image for the city; such a culture more focused on the SAR area, usually are in the idle area, with agencies responsible for planning and management base .

Research Methods

Object and Data Collection

The research methodology is mainly through secondary data collection, then to cross-case analysis, trying to understand different cultures and models of innovative mechanisms park. In this study, secondary data is used as the basic source of information and forms, the reason why

this study uses secondary data to do a case analysis is based on the following reasons. 1. The amount of second-hand information on the sample size is very large, so have the advantage of the time; 2. The degree of the objectivity of second-hand information is high; 3. Secondary data contains reproducibility (Honest, Su-In Hsu, Jiing-Lih Farh, Po-Hsun, 2008). For the reasons above, the research methods used in this study includes the collection of second-hand case data, and the sorting out the analysis for the case to understand the different cultural park creative mechanisms and modes.

The trustworthiness of this study is related to the collection of the data from internet, books, newspaper, magazines and other various sources. Therefore, the method adopted in this study which contains multiple sources of evidence is called triangular test(Denzin, 1978), and in this way, second-hand information getting through various sources of evidence provides the analytical appraisal of evidence from various sources to complement each other to improve the quality of this research. The data is mainly collected through the Internet to search by Google's keyword query, and the query sequence is divided into three parts. The first search keyword is "cultural park", which appears more than 30 pages. This study records every name of cultural park form the first page to the twelfth page since a lot of repeats of information have been found after the twelfth page. The keywords for the second time are the names cultural parks, and then record the name and activities of the park. The third time is to choose the park which has the most activities, and then search each activity separately to understand the contents and record each activity.

Data Analysis

Nearly one hundred of the cultural parks are located in Taiwan with various kinds of scales of themes, thus in this study, the cultural parks in Taiwan will be catalogued into seven

parts according to the cultural park's theme and content as the following (1) creativity type (2) historical site type (3) farming and forestry type (4) local characteristics type (5) ecology care type (6) sugar related type (7) national culture type, and so on seven big types. In this study, the selected two parks of each type is decided by the most amount of activities.

Creative Type Culture Park

Huashan Culture Park: The Government sets the position of Huashan Culture Park as the base for Taiwan's artistic creativity with the expectation to promote Taiwan's creativity out by this park.

Hualien Culture Park: This park is designed to combine arts and culture to promote the natural landscape and beauty of the East to the populace.

Historical Site Type Culture Park

Anping Harbor National Historical Park: The position of this cultural park is to combine the surrounding ecology and snack, with the harbor as the axis settled by the government to cooperate with the surrounding and civil society to hold various kinds of activities, which are fit for this park and Tainan City, to invite people through the mass media to participate.

Hungmao port settlement in Culture Park: Its position is set to retain and activate the precious cultural heritage, which is within the range of old settlements of Hongmao Port, to continue the harbor history and the accumulation of citizens' memory and to be an important landmark of cultural preservation, public education, tourism and leisure in Kaohsiung.

Farming and Forestry Type Culture Park

New Farm Cultural Park: It is set to be alternative agricultural economy promoted by the government to accommodate the concept of leisure travel; furthermore, after the farm becomes the cultural park, the populace could experience the interest in gathering a harvest, which is an

alternative leisure activity for people who live the urban life.

Cultural Park, the wine industry: It is the first museum of grape industry in Taiwan, which is set to create a cultural park where people can fully understand the whole things of grape.

Local Characteristics Type Culture Park

Hualien County Stone Museum: This is for the establishment of Hualien cultural characteristics, which is also the exhibition of the achievement of sculpture in Taiwan.

Fangliao F3 Arts District: It is not only for the blending of the nature and human beings' life, but also for the firm combination of the various kinds of sustainability as the following: the local space, the local economy, culture, and the life characteristics.

Ecology Care Type Culture Park

Taijiang Ecological Culture Park: The park is mainly located in the eco-culture in order to make the park to show the variety of ecological and cultural appreciation and understanding to the public.

Lintienshan Forestry Culture Park: This park is a natural forest eco-cultural park, and its main purpose is to preserve the early Taiwan's agricultural society, which relying on Lintienshan on the logging industry boom.

Sugar Related Type Culture Park

Hualien Railway Cultural Park: Hualien County Government re-built it to retain its old railway culture and also to combine it with new urban development plan to make it be a good place for people in Hualien and in other areas to spare their leisure time here.

The new business of the Railway Cultural Park: It is to keep the early culture of the old

railway station, so that modern people could understand both of the process of producing sugar and the situation when the train carried sugar cane. Taiwan Railway Administration will complete the early culture preservation so that people can fully understand the prevailing social condition.

National Culture Type Culture Park

Hakka Cultural Park: It is for Hakka culture to be preserved, expanded and blended with life, and for letting more people understand Hakka culture, so the establishment of the park allows more people to experience and understand Hakka culture.

Tsou Tribe Cultural Park: Through the cultural display and performances in this park, the public is able to understand the living way and customs of Tsou tribe, and to integrate themselves with the life situation of Tsou so as to experience the traditional culture of the Tsou.

The analysis of the park classification, innovation, type of activity, the park elements such as positioning and innovative data stated above, see Table 1.

Table 1. Object Of Study Culture Campus Service Innovation Data Sheet

Classification	Park	activities of innovation	Types of activities	Park Location	Innovative elements		
					Source of innovation	Core Values	Promote the resources
Creative Type Culture Park	Huashan Culture Park	4A Advertising Awards	Game	Taiwan, the artistic creative base	Service itself	Creative Culture	Government
		Hua Jing-Biao	Activities Exhibition		Customer-driven	Student Creativity	School
		Spring test document	Experience the people		Customer-driven	People experience	Government
		Sunlight 8 school · Dance sound than the United	Propaganda		Customer-driven	Anti-drug propaganda	School
	Creative Cultural Park in Hualien	《Meet with the public》Lecture Theatre	Experience the people	Combination of culture and the arts and tourism	Service itself	People experience	Artists
		Hualien spring Live Show	Experience the people		Customer-driven	People experience	Artists
		Urban aesthetic thought and expression	Activities Exhibition		Service itself	Architectural design	Government

Classification	Park	activities of innovation	Types of activities	Park Location	Innovative elements			
					Source of innovation	Core Values	Promote the resources	
Historical site type culture park	Anping Harbor National Historical Park	《Festival、Avoid、Remember》	Activities Exhibition	And the surrounding park with snacks evolved	Service itself	Traditional Culture	Government	
		Natural extension	Natural landscape		Service itself	Ecology	Government	
		Taiwan Lantern Festival fireworks	Activities Exhibition		Customer-driven	People experience	Government	
		Anping Recreational Pier Shopping Street	Combined with the surrounding environment		Customer-driven	surrounding culture	Civil society	
		Saxophones Just Jazz Concert	Combined with the surrounding environment		Customer-driven	People experience	Artists	
	Settlement Cultural Park Hong Mao	Japan Ondekoza Village line running feet	Activities Exhibition	By heritage to pass on cultural heritage	Service itself	Traditional Culture	Government	
		Ocean Valentine's Day	Combined with the surrounding environment		Customer-driven	People experience	Government	
		Ming Hwa Yuan Taiwanese Opera Troupe	Activities Exhibition		Customer-driven	Traditional Culture	Civil society	
		Sea Pearl --- Kaohsiung harbor	Combined with the surrounding environment		Service itself	People experience	Civil society	
		「Culture Stories」	Propaganda		Internal Services	Traditional Culture	Government	
	Agricultural Type Culture Park	Cultural Park, New Farm	Personally Strawberry activities	Product sales promotion	Alternative economic agricultural Cultural Park	Customer-driven	People experience	Government
			Local Fresh fruits and vegetables, Tea trading	Product sales promotion		Customer-driven	People experience	Government
			15 meters high pavilion	Natural landscape		Service itself	Ecology	Government
		Cultural Park, the wine industry	Natural landscape appreciation (Appreciate the natural landscape)	Natural landscape	Taiwan's first cultural park Grape	Internal Services	Ecology	Government
			Grape Awards	Game		Internal Services	People experience	Park itself
The establishment of the Taiwan Museum of grape			Featured Building	Internal Services		People experience	Government	
Fermenting grape wine			Experience	Service		People experience	Park itself	

Classification	Park	activities of innovation	Types of activities	Park Location	Innovative elements		
					Source of innovation	Core Values	Promote the resources
Types of local characteristics and cultural park	Hualien County Stone Museum	Exclusive market	the people Product sales promotion	To stone to represent local culture in Hualien	itself	e People experience	Park itself
		Stone Outdoor Open Creation	Game		Service itself	Characteristic Culture	Government
		Stone Carving Workshop	Featured Activities		Service itself	Characteristic Culture	Artists
		International Stone Sculpture Festival in control of traditional Chinese art	Activities Exhibition		Service itself	Characteristic Culture	Government
		Stone City	Featured Activities		Service itself	Characteristic Culture	Government
		Dream of stepping stone	Activities Exhibition		Customer-driven	People experience	Government
		Artists move into the Arts District	Art Platform		Internal Services	Art of Culture	Government
	Fangliao F3 Arts District	King snake	Featured Activities	Service itself	Characteristic Culture	Government	
		Spring Scream in Fangliao F3	Combined with the surrounding environment	Customer-driven	People experience	Civil society	
		Mosaic new dream home	Featured Activities	Service itself	Characteristic Culture	Government	
	Type Culture Park Conservation	Eco-cultural park Taijiang	Mosaic Art Forum	Activities Exhibition	Service itself	Characteristic Culture	Government
			Four grass tour itinerary	Natural landscape	Customer-driven	Ecology	Government
			Mangrove raft trip	Natural landscape	Customer-driven	Ecology	Government
			Oyster oyster raising trip shed	Natural landscape	Customer-driven	Ecology	Government
Lintienshan Forestry Culture Park		Bird-watching trip	Natural landscape	Customer-driven	Ecology	Government	
		Early forestry logging tool	Featured Activities	Service itself	Ecology	Government	
		Forest Railway pedestrian trail	Natural landscape	Service itself	Ecology	Government	
Hualien Railway	Gas Car Show	Featured Activities	Service itself	Characteristic Culture	Government		
	Explore the mystery ring	Natural landscape	Service itself	Ecology	Government		
	Lintienshan Community Cafe	Featured Building	Customer-driven	People experience	Park itself		
	Static display of buses	Featured Activities	Railway	Service itself	Characteristic Culture	Park itself	

Classification	Park	activities of innovation	Types of activities	Park Location	Innovative elements			
					Source of innovation	Core Values	Promote the resources	
TSC-related Type Culture Park	Cultural Park	Hualien and Taitung Railway recreation, and tourism	Combined with the surrounding environment	characteristics together with the local culture	Customer-driven	People experience	Government	
		CIS Identification mark activities	Activities Exhibition		Internal Services	Characteristic Culture	Government	
		Older residents recalled the exchange	Featured Activities		Service itself	Traditional Culture	Government	
		Japanese-style dormitory	Featured Building		Service itself	Characteristic Culture	Government	
		Pint-sized car	Featured Activities		Service itself	Characteristic Culture	Government	
	Sinying railroad culture park	「Old days, sugar」	Product sales promotion	Early railway heritage preservation and presentation	Customer-driven	People experience	Government	
					Customer-driven	People experience	Government	
		Hakka Culture Park	Love the blue shirts off	Propaganda	Promotion of Hakka culture	Service itself	Characteristic Culture	Artists
			Hakka puppet	Featured Activities		Service itself	Characteristic Culture	Park itself
			Fashion-off device	Featured Activities		Service itself	Characteristic Culture	Artists
Tsou Cultural Park	Teaching experience Hakka culture	Propaganda	Tsou culture transfer	Customer-driven	Characteristic Culture	Government		
	The movie "1895" Special Ying will	Propaganda		Service itself	People experience	Park itself		
	Life Bean Festival	Activities Exhibition		Service itself	Characteristic Culture	Park itself		
	Arts and crafts	Product sales promotion		Customer-driven	People experience	Park itself		
	Tsou artists stationed	Art Platform		Internal Services	Characteristic Culture	Government		
National culture type culture park	Special crop products	Product sales promotion	Indigenous cuisine	Customer-driven	People experience	Park itself		
	Indigenous cuisine	Product		Customer-driven	People	Park itself		

Classification	Park	activities of innovation	Types of activities	Park Location	Innovative elements		
					Source of innovation	Core Values	Promote the resources
			sales promotion		driven	experience	

Data source: This research reorganizes voluntarily

Findings

The findings of this study are as follows (see Table 1.). Different types of cultural park has its own different types of service innovation: (1) creative type of cultural park, their activities and the core values of the most diversified, multi-agents for the government, schools, and artists; (2) types of cultural heritage Park Type Culture Park and local characteristics are more similar activities focused on its innovative exhibitions, the core value of cultural transmission main, the main promoters of tailor-government; (3) agro-forestry and eco-park type of culture than the similar type of cultural park, its activities focus on the natural landscape, the core value of agro-forestry park trading opportunities than the focus, so more emphasis on the public experience, while the ecological type of park is the core value of the natural eco-oriented, but both are driven primarily from government resources; (4) local characteristics and TSC-related type is similar to the type of park, as its theme are developed in accordance with local characteristics, characteristics of the activities of its activities mainly main characteristics of the core values of culture and agents of the government; (5) national culture type's park, its activity mainly in the guidance and the product sales promotion, its core value is wants to promote the characteristic culture, mainly impels the resources from the park itself.

Cultural Park in Taiwan the main driving service innovation resources, mostly from government sources. Cultural Park will be different according to geographical zone into the core of a different culture.

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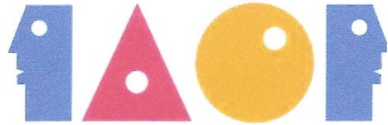
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USER ENGAGEMENT BY USING A KNOWLEDGE-CREATION BASED MODEL IN THE VIRTUAL COMMUNITY

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Abstract

In this paper, we propose to organize knowledge generation and management as the foundation of the 7C model, by distinguishing the individual and the organization, and the tacit and explicit level presented by the spiral, knowledge-producer-oriented perspective to explore the existence of virtual communities in cyberspace. Through web-based organizational design features, hyperlinks play a role in the exchange of knowledge generation and to improve their core operational capabilities, access to the best competition of interests and economic value. According to the theory of knowledge management stages of development, knowledge sharing can be considered as the first generation knowledge management and is not only defined as transmitting knowledge to target receivers, but also as being used by people, and the continuation of knowledge creation and future value creation of the user engagement model. In the virtual community development process, ways are still being explored to improve, to effectively improve sparse data limitations, and this study provides matrix-clustering technology to explore the virtual community among its members on the behaviors of interactive evolution of knowledge creation and user engagement features in value creation, so that the internet community can continue to operate on principle of the best decisions.

Keywords: 7C model, Spiral, Knowledge creation, Matrix-clustering, User engagement

Introduction

At present, the various business organizations in commercial core operations are facing a complex and urgent challenges, involving individuals, groups and inter-organizational

knowledge generation processes, which been regarded as the most important corporate competitive advantage (Nonaka & Takeuchi, 1995; Vorakulpipat & Rezgui, 2006), and with the Internet's rapid progress in information technology, economic, marketing, and any community-based activities are all greatly influenced by the virtual community (Teo, Chan, Weib, & Zhang, 2003), and the use of management techniques and members of the community interaction, information gathering, and knowledge of trading has become the trend of the times.

Only the virtual community can reach such a critical mass of business, and only after bringing a large number of business interests, from community members to create discussion, will personal beliefs, attitudes and behaviour information for commercial marketing and service advertising, bring about great value and interest (Hemetsberger, Andrea & Georg, 2007), the dynamic knowledge derived from assets and the value of factors such as the fans, exchange in epistemology and ontology spiral levels, and enhance organizational competitive advantage.

This study used virtual knowledge-sharing behaviour among the members of the virtual community and community members, using matrix-clustering techniques and 7C model to construct knowledge creation process. Derived from the development model in accordance with its community to explore the value of the follow-up of knowledge creation and user engagement, to meet the knowledge needs of producers and the reader-oriented, providing personalized community knowledge-sharing and recommendation, the main purposes of this study include:

- Information Categories: Posts themes based on different weights of the various sub-categories of membership qualifications, grouping by matrix method, a variety of information classified according to similarity threshold to the appropriate classification.

- Knowledge creation and evaluation: According to the spiral procedures of knowledge creation, among the members of the organizations concerned, language and technical background to assess the sustainable operation of the virtual community of suitability.
- Knowledge value creation and user engagement: Based on third generation knowledge management concepts (Chase, 1997; Gebert, Geib, Kolbe & Brenner, 2003; Vorakulpipat & Rezgui, 2006), focusing on the value creation of knowledge , with the human networks, social capital, intellectual capital, technology assets, and process changes, a combination of community factors such as user engagement, and quality of knowledge value creation.

The Theoretical Model and Hypotheses

The following sections elaborate upon our theoretical model (see Figure 1.)

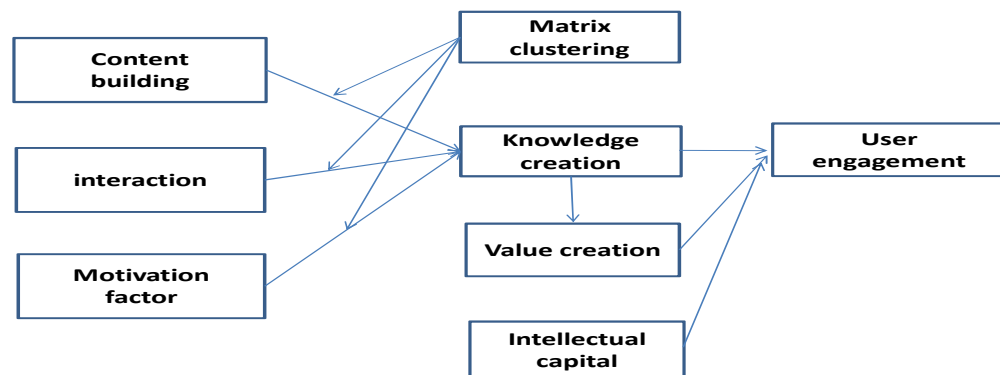


Figure 1. The Theoretical Model

The Critical Success Factors of Knowledge Sharing

Community knowledge of the evolution of several important issues is implicit (Bieber, Engelbart, Furuta, Hiltz, Noll, Preece, Stohr, Turoff & Walle, 2002), in its competitive process, mainly in the study that possesses the consumer and provides customer service tools, to increase the bargaining power of suppliers in each single evolutionary point of time, therefore value

creation depends mainly on the behaviour of whoever has the information and transaction.

Because the Internet community attracts target consumers and creates more consumption while maintaining good customer relationship management, consumers are given sufficient information and good service, allowing business operators to create another path different from the traditional choice, and this social phenomenon, results in a significant impact on traditional business (Bressler & Grantham, 2000; Kozinets, 2002; Subramani & Peddibhotla, 2004; Wasko, McLure & Faraj, 2005). The survival of the community depends on member loyalty and content of the attractiveness of member profile information and trading activities factors (Hagel & Armstrong, 1997). Pine (1999) has argued that the economic value of the community is divided into products, goods, services, and five other kinds of experience and transformation. As a result of transaction services, loyalty and feedback interaction elements, members can have full use of community assets, on the Internet to create unlimited business opportunities. We therefore propose the following hypothesis and the key factors in the success of the virtual business community as displayed in Table 1.

Hypothesis 1: One's degree of content building is positively related to one's engagement in knowledge sharing with the virtual community.

Hypothesis 2: One's degree of interaction is positively related to one's engagement in knowledge sharing with the virtual community.

Hypothesis 3: One's degree of motivation factor is positively related to one's engagement in knowledge sharing with the virtual community.

Knowledge Creation and User Engagement

At present, there are at least three accounts of generations of Knowledge Management (Firestone & McElroy, 2003), three generations of KM are summarized in Table 2. Knowledge sharing is a dynamic process or continuous learning, not a static process (Gilbert & Cordey-Hayes, 1996), Knowledge sharing is a process of communication, when the organization's

members learn from each other's knowledge, and is the sharing of knowledge of others (Hendriks, 1999).

Table 1. CSF of Virtual Communities

Study	Critical Success Factors
Sangwan (2005)	Content building
Preece(2000,2001)	Sense of ownership Sociability and usability
Rodgers et al.(2005)	Online quality
Koh and Kim (2003)	Offline activities
Donate (1999),Wasko and Faraj(2005)	Pro-social behavior, altruism, reputation
Hagel and Armstrong(1997) Huang and Yen(2008)	Loyalty
Kankanhalli et al.(2005)	Trust and influence
Leimeister et al.(2006)	Member data are sensitive resources

Knowledge holders sharing the purpose of knowledge are expected to receive the benefits of self-interest, the effectiveness is also better. Major points emerging from the review can be summarized as follows: information technology, human interaction, KM strategies, motivation and trust. Knowledge creation is an organizational, social, and collaborative dynamic process through interaction between tacit and explicit knowledge, Four modes of knowledge through the SECI model are proposed, which is the spiral, interaction process of knowledge conversion between tacit and explicit knowledge (Nonaka, Toyama & Konno, 2000).

Table 2. Generations of KM
(Chalee & Yacine, 2008)

	Koenig's account	Snowden's account	McElroy's account
First generation	Knowledge sharing	Decision support	Supply-side KM
Second generation	Organizational learning and knowledge creation	Tacit/explicit knowledge conversion	Demand-side KM
Third generation	Taxonomy development and content management	organizations as engaged in sense-making	N/A

Oinas-Kukkonen (2004) proposed the 7C model for understanding organizational knowledge creation, which consists of Connection, Concurrency, Comprehension, Communication, Conceptualization, Collaboration, and Collective intelligence, and is described as the dimension of different contexts: technology, language, and organizational contexts (Lyytinen, 1987), the framework assumes that Concurrent Connection of all stakeholders with the joint information space is provided in a technologically sound manner. The 7C model follows Nonaka and Takeuchi (1995) in that the integration of individual and organizational orientations is emphasized and that knowledge is assumed to create through interaction between tacit and explicit knowledge (Tervonen et al., 1997). The 7C model is a spiral process, as shown in Figure 2.

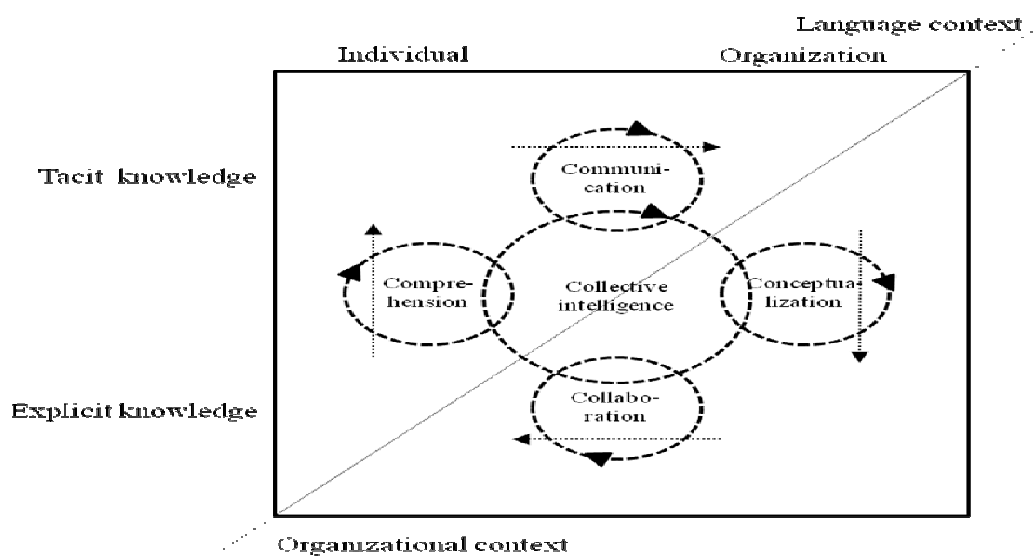


Figure 2. 7C Model
(Oinas-Kukkonen, 2004)

Accordingly we propose:

Hypothesis 4: The style of the discovery (Pattern discovery) is a positive impact on knowledge generation.

Hypothesis 5: The community-based model will facilitate a positive impact on knowledge generation.

Despres and Chauvel (1999) suggested that knowledge can be described as a source of value creation, Liebowitz and Suen (2000) included value creation into knowledge management metrics for measuring intellectual capital. Moreover, Amit and Zott (2001) studied the value creation in e-business and identified four main drivers: efficiency, complementarities, lock-in and novelty, knowledge resources contribute to create value not only by themselves but also by their dynamic interactions (Teece, Pisano & Shuen, 1997), so by assessing the links between knowledge assets and value objectives, virtual community managers can better align many investments in knowledge capital. How knowledge assets are engaged, separately and as clusters is addressed in value creation dynamics issues (Daniel & Giovanni, 2009). Community engagement is a planned process with the specific purpose of interactions between people, some examples of community engagement undertaken by government practitioners include: information of the community, consulting the community, part of the decision-making process, and collaborating with the community (Calvin & Shan, 2008). As long as the majority of their own interests, spiritual, financial capability to focus on a particular job who can be called "fans." Fiske (1992) considered that "fan" of the organization (fandom) itself is "productive" (productive), that is with a creative activity, in particular the "fans" have their own high degree of "recognition" (identification) and "involvement" (involvement), so "fans" are in accordance with their respective interests, forming different communities. Securing commitment and getting the most out of interactions with users are two key factors which must be considered in user engagement. Thus, it describes how much a participant is interested in and attentive to a conversation. We thus propose:

Hypothesis 6: Community members of the fans have a positive influence on the knowledge value creation.

Research Method

The main purpose of cluster analysis is to identify certain characteristics under certain criteria similar to the object, according to the object properties to be divided into several sub-groups, so that each has a high degree of homogeneity within groups, and between different groups are highly heterogeneous. Oyanagiet, Kubota and Nakase (2001) proposed a new mining method named matrix clustering as computing the corresponding target. A target matrix A_{ij} is shown in Fig.1., where the row represents customers and the column represents products. Namely, $A_{ij} = 1$ means that a customer- i has bought a product- j , and $A_{ij} = 0$ means that a customer- i has not bought a product- j , A_{ij} is a large-scale sparse matrix. Similar to the Apriori algorithm that support is defined as an area of extracted sub-matrix, and confidence is defined as the density of extracted sub-matrix. Density can be calculated by dividing the total count of received markers at activated nodes by the area. The density of sub-matrix at the final stage in Figure 3 is $8/9=0.89$.

Oyanagiet et al. (2001) proposed a new fast ping-pong algorithm to reduce the execution time by utilizing the sparseness of a matrix. The algorithm iterates marker propagation between rows and columns until the state where the activated columns and rows are not changed. Pruning is performed by comparing the count of received markers with a threshold value. The structure of ping-pong algorithm is shown in Figure 3. below.

Data Collection

At present various types of community organizations, are showing rapid growth, but the number of posts, popularity degree, and advertising is asymmetrical, therefore this study adopts a membership sensitivity, site response time, the contents of real time, continuous control, membership needs, user behaviour, loyalty, information type and other factors (Leimeister &

Krcmar, 2006), as the basis for selection of information. This paper investigates Taiwan Mychat Website (<http://bbs.mychat.to/index.php>) empirically to find the link between user engagement and knowledge creation. Members were selected randomly, we surveyed from 10 to 20 members in each sections, data were collected for 2009/01 - 2009/07. This study selected 100 community members, covered the theme of Posts 90 had 1350 documented valid transactions, relationships array is 100×100 array, the density of the overall value of 25%. Table 3 highlights the relationship between members and posts behaviour information matrix.

```
While (convergence) {
    Row_to_col(); Prune_col();
    Col_to_row(); Prune_row (); }
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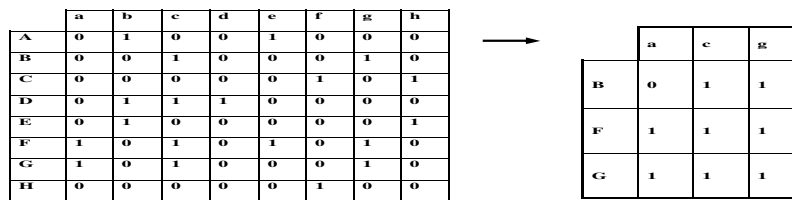


Figure 3. Dense sub-matrix

Measurement Model

In this study, members of the group as a community computing start value, through the mapping of posts themes, find out the specific features covered by other groups, and the ultimate goal is to build community sustained activation of the survival pattern of behaviour, the establishment of user engagement in future clustered index, and the empirical research framework shown in Figure 4. Matrix clustering method rather than the traditional Apriori algorithm is applied to a large number of rows and columns in cluster search, which will involve further analysis that

effectively shorten the time of the constraints, This research takes the group that is identified by the application of at least 80% of the group of density, accuracy and area coverage rate (Hinneburg & Keim, 1999; Ankerst, Breunig, Kriegel & Sander, 2009), and containing at least three community members, and posts themes in order to meet the results of the search limits (Oyanagi et.al., 2001). By using matrix clustering method calculation with Excel VBA macro program development, the search for the optimal density degree of clustering results, with the SECI model (Nonaka & Takeuchi, 1995) fits the results, presented in Figure 5.

Analysis and Results

To enhance the core operating performance organizations need to have a share and generate

Table 3. Behaviours of Information Matrix

	Synergistic	Extraction	Richness	reputation	emotional	self-confidence	loyalty	advertising	security	trust	psychology	will	Interest	Popular
Memberships														
1	0	1	1	1	1	0	1	1	0	1	1	1	1	1
1. Forum	2	1	1	1	1	0	0	1	1	1	1	1	1	1
General	3	1	0	1	1	1	0	0	0	1	1	0	1	1
Focus	4	1	1	0	0	0	1	1	1	1	0	1	1	1
2.VC	5	1	1	1	0	0	0	1	1	0	1	0	1	0
General														
Professional	100	1	1	1	1	0	0	1	1	1	0	0	0	1

knowledge across the system. This 7C model extension of the original SECI process provides, comprehensive knowledge on the level and ontology level, and 7 C in turn plays an important role in organizational knowledge, Lyytinen (1987) also proposed the organization, language and technology background concepts and presented abstract background 7C relations. This produces aggregate user participation factors (such as: identifying the end-user, recruiting end-users, getting

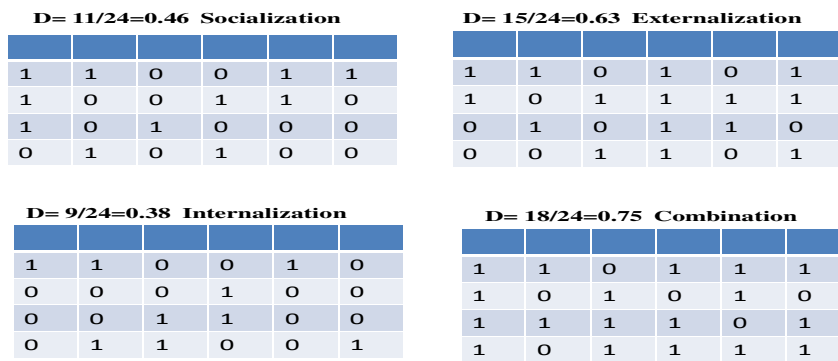


Figure 4. Ping-Pong Algorithm

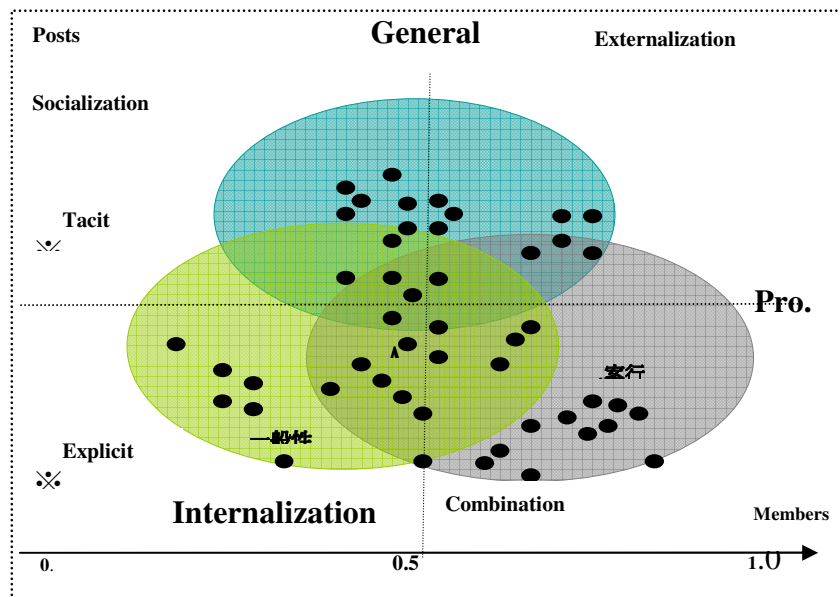


Figure 5. Distribution Process

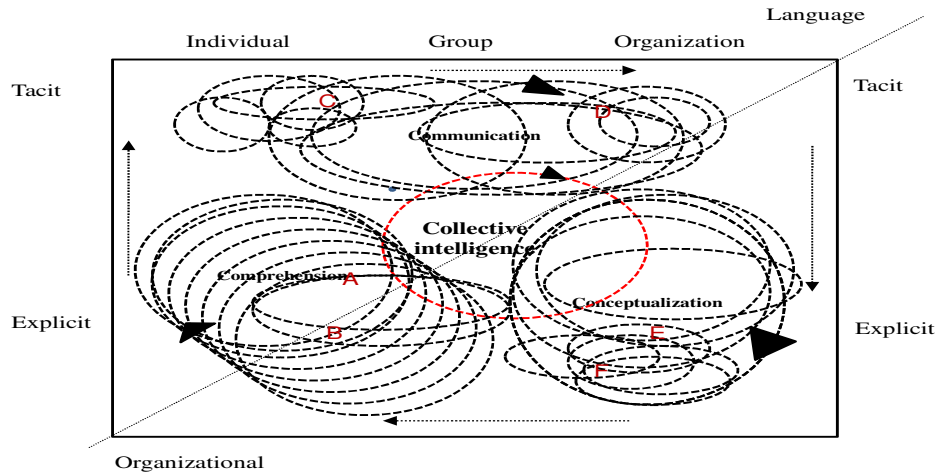


Figure 6. Distribution of Combined Clustering with 7C

the most out of interactions) that are closely related, and the 7C model fit the results, presented in Figure 6. This study shows the validation results in Table 4:

Table 4. The Results of this Study

Cluster	Row / Col.	Density	Group characteristics
A	25 X 20	0.48	(posts/members) more
B	30 X 20	0.35	(posts/members) more
C	8 X 15	0.41	posts more
D	6 X 10	0.68	posts more
E	15 X 6	0.79	members more
F	8 X 5	0.85	members more

Groups A and B are biased towards the earlier of the Forums are now thriving, and loyal users participate in information sharing, (in addition to probing psychological curiosity, the widespread worry in the community of making friends, to establish friendship networks), so repeat of information is on the high side, and there is less focus on the professional community of trading and ceremonial behaviour. Loyalty and trust is low, and the turnover rates match more suitable types of e-commerce community, and suitable recommendations to the high age of entry participation.

Groups C and D make expanded emphasis on the recruitment of community members, in addition to the professional community, to enhance the reliability and technical service satisfaction, to participate more actively in recommending a large number of users of the knowledge professional dedication, the community in this phase, should be classified Posts gradually improve the states, and there has been a contending transactions advertising period, by the analysis of array data that, at this stage in anti-viral protection, online brokerage, themes and replies to protect security, have been strengthening in implementation, for recommendation to have a steady job and have more conservative grassroots members to participate.

Groups E and F are biased towards the building of community expertise, in addition to maintaining member loyalty and trust givers, make better use of incentives to reduce the digital divide to meet with friends using customized interaction of the highest priority, combined with Web 2.0 design, active use of word of mouth marketing, value-added commercial products recommended to make the community become embedded in ordinary life, the establishment of community-based and universal goals daily, for recommendation to all levels of society, like a chain store popularity of convenience stores This stage is a development on the participation of members (members of the fans) that provides the best opportunity.

Discussion and Conclusion

For the current structure of the Internet community, the majority still uses the non-profit approach to business, but a long-term perspective, between community members and business interaction, not only in trading, interest, fantasy, relationships coordination function with center needs, and development of products and services needs of individual members of the business process and information technology integration model, and the establishment of a new customer relationship management a different approach is needed. Internet community agents play the role

of marketing through searching and the ability to help companies expand in the market. This study is based on matrix clustering, interaction between members of the virtual community, and the evolution of cooperation and knowledge creation, and the main purpose of participation in the search for potential user engagement is to build a group recommendation system. The empirical results of this study can be summarized in the arguments proposed:

For different data array, the clustering method be used under the conditions, and might continue to create an effective community group to identify survival.

For the community in a particular group to posts themes (knowledge sharing), as recommended to the community managers, and help one-to-one customized implementation of marketing decisions. Posts on specific topic, can identify the most suitable ones for their respective groups of user engagement, and community groups can develop different best promotions

The fit parameter set was adopted in this study, and in the corresponding array, only elements of value 1 are weighted, since the group might want to search for the unknown, designated areas of the setting will affect the search group upper and lower boundaries, so the actual implementation should adopt liberal acceptance, re-use part of the array density to closely examine the principles, to achieve a more objective judgement of the results. The higher “Community Engagement” and smaller “Normative Community Pressure” let community members’ brand community loyalty higher (Mollen & Wilson, 2009).

Finally, this study found that when the Community posts are richer in content and disorganized, the community features are summarized in the present slowdown phenomenon, especially when the recommendations of the private nature of posts are more universal, but the loss rate of community members present demand is high and security is an increasing

phenomenon, of which the network (owing to the lack of interpersonal confidence-building mechanisms, and weak relations of user engagement), results in a brief presentation of the stagnant growth of the community.

For limitations of the study, the matrix-clustering method is only suitable for use in the relationship between the array of binary values, and still needs further information on the value, converted to the analysis, but it will make the meaning of the original data possess distortion, however, when dealing with the relationship between the array of large-scale quantitative values, computing may be time-consuming.

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A STUDY ON ORGANIZATIONAL INNOVATION'S POSITIVE EFFECTS ON THE CULTIVATION OF YOUNG CHILDREN'S REASONING ABILITIES

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Abstract

This study is to explore how the organizational innovation teaching promotes young children's reasoning abilities. 24 young children in one kindergarten class were taken as the experimental group subjects while 27 other young children in another class were taken as the controlled group subjects. Reasoning scaffold teaching was conducted in the experimental group. With the hints in the interface operations, the young children were guided to stimulate their reasoning thinking and the learning potential. The objectives of this study include: 1. to figure out the general conditions of young children's reasoning abilities, 2. to explore the organizational innovation's efforts on the promotion of young children's reasoning abilities, 3. to explore the organizational innovation's efforts on the transformation of young children's reasoning abilities.

The results of the study are listed as follows. 1. Experimental group young children's reasoning abilities after the organizational innovation teaching are higher than the ones before the organizational innovation teaching. 2. Experimental group young children's ordering, classifying, identifying, and transformation after the organizational innovation teaching are higher the one before the teaching. As a result, experimental group young children's ordering, classifying, identifying, and transformation are all promoted by organizational innovation teaching. 3. Experimental group young children's ordering, classifying, identifying, and transformation abilities after the organizational innovation teaching are all superior to the ones of the controlled group. 4. The pretest grades were taken as the co-variable while the posttest grades of the two groups' young children were taken as the dependent variables, and One-Way Univariate ANCOVA was conducted. The result shows that the ordering, classifying, and classifying abilities of the young children of the experimental group after the organizational innovation teaching are all higher than the ones of the control group. Besides, high percents of variation can be explained. 5. There are high degree of co-relations among different perspectives of young children's reasoning ability (including ordering, classifying, and identifying) .

Key Words: young children, reasoning abilities, organizational innovation

Study Motivation and Purpose

Reasoning is to help individuals understand the environments and the cause-effect relationship between the problems and situations and work out related solutions. For individuals, reasoning is the process to apply their abilities to find out efficient solutions to complex problems in daily lives and to adapt themselves to the unstable social realities (Berk, 2001) . Reasoning abilities are important indexes to understand an individual's cognitive ability and intelligence. It is also indispensable for science, mathematics, and problem-solution (English& Halford, 1995 ; Seigler, 1998) . Besides, it is also crucial for individuals' career development, reading comprehension, and social interaction (Wright & Dowker, 2002) . Recently, children education scholars and science education scholars put more and more emphasis on reasoning (Johnson, 1999 ; Kipawrick, Swafford, & Findell, 2001) . Therefore, to develop young children's reasoning abilities as earlier as possible become a must.

Piaget (1972) points out that the young children lack of sense of logic in the course of their inferring of causes and effects. In the perspective of ordering and classifying, they do the classification according to only one characteristic. They are not able to take two or more characteristics into consideration. Theoretically, development of minds follows inner and natural rules, and the external teaching must cooperate with the potential which individuals have developed To be specific, teaching must depend on the development of learners, while learners' development is not influenced by teaching and learning (Kinginger, 2002) . However, Vygotsky (1987) holds a rather positive and optimistic attitude toward the viewpoint of learning, development and the functions of education. Knowing that young children can show

the abilities of reasoning and have the potential of developing higher reasoning abilities, teacher and experts can guide young children to develop these abilities further.

The researcher was invited to supervise some kindergartens by the Ministry of Education recently. He found that most of the teaching materials were simply selected from the materials of private publisher. The contents of these teaching materials were lack of flexibility. The teachers followed the materials without further modification and interpretation. The teaching activities could not inspire young children's reasoning abilities. Besides, they are rather counterproductive to the development of young children's creativity abilities.

Nevertheless, there are few studies related to this issue. The researcher wanted to do the researches to explore how the organizational innovation and teaching innovation improve young children's acquisition of reasoning abilities and development of potentials.

The purposes of the present study are:

- (1) to understand the general situation of young children's reasoning abilities
- (2) to explore the organizational innovational teaching's effects on the promotion of young children's reasoning abilities
- (3) to explore the difference between the experimental group young children's reasoning abilities and the ones of the controlled group and to understand the conditions of the transformation after the organizational innovation scaffold teaching.
- (4) to explore the co-relations among different perspectives of young children's reasoning abilities (including ordering, classifying, and identifying) after the organizational innovation scaffold teaching.

Interpretation of the Terms.

Young Children

Hurlock (1978) considers that early childhood refers to the age between two and six years old. Erickson (1963) classifies the children whose age between two and three years old as young children. In the present study, the term, young children, refer to the kids whose age is between five and six years old.

Reasoning

Reasoning refers to applying some principles generated from the known things to find out the unknown ones. Therefore, reasoning activities are the mental progress of finding the relationship between causes and effects. In this study, reasoning refers to the scores young children got in answering the reasoning questions. The higher the score is, the higher the reasoning ability is. And reasoning abilities include ordering, classifying, and identifying.

Organizational Innovation

Hodge, Anthony & Gales (2003) point out that organizational innovation refers to the offbeat choice for the present circumstances. In other words, it means the systematic change of organizations, the change of the relationship between inputs and outputs, the change of the course of techniques or transformations, the change of personnel' roles in organizations, organizational cultures' change, and the changes of the situations of all the perspectives within the organizations. In the present study, the organizational innovation refers to organizational innovation in schools, including the innovation of teaching modes, teaching resources, and administrative operation.

Literature Review

Organizational Innovation and the Efficiency of Schools

The Definition of Organization Innovation

J. A. Schumpeter (1982) is the first scholar who proposed the term, innovation. It means the main motive force pushing the economic growth and would generate creative destruction. Afterward, different scholars define it differently according to different research focuses and viewpoints. Based on the multiple viewpoints, Hodge, Anthony and Gales (2003) point out that organizational innovation is one kind of offbeat choice for the present situation, namely, the systematic change of organizations, change of the relationship between inputs and outputs, the change of the course of techniques or transformations, the change of the roles of the personnel in organizations, change of organizational cultures, and the changes of the situations of all the perspectives within the organizations.

Recently, industrial companies, more and more schools and other kinds of organizations are applying the concepts of innovation to organization management and technology innovation to promote the efficiency of organization management. Damanpour (1991) finds out that the positive correlations between technique knowledge resources and radical innovation are higher than the ones between technique knowledge resources and gradual innovation. If organization innovation is applied in school organizations, innovation of teaching modes and innovation of teaching resources is the substitution for technique innovation. In addition, for school administration, innovation of administration operation is the substitution for management innovation.

1. Innovation of Teaching Modes:

Innovation of teaching modes refers to that teachers apply their teaching ideals to find out unconventional and appropriate teaching methods or tools to conduct teaching activities, encourage other people to cooperate with them, and find out suitable resources to fit the systematic teaching. Amabile (1996) considers that students will have more active performance

and more inner motivation to learn when they see their teachers dedicate themselves to teach them. In this way, students' inner motivation can be enhanced by teachers' attitudes and become more self-oriented. At last, their learning efficiency can also be enhanced.

2. Innovation of Teaching Resources

Innovation of teaching resources refers to that schools provide teachers with appropriate teaching resources as teaching assistance. This innovation includes the purchasing new teaching facilities and the increasing teaching budgets. The new strategy of organization innovation is that schools provide the staff with proper resources, including sufficient personnel, facilities, counseling ways, and budgets (Hodge, Anthony & Gales, 1996) . Therefore, schools should have innovative facilities, make teachers use information facilities sufficiently and organize the network learning community to share knowledge and information and solve the teaching problems in the teaching reality which happened in the course of the reform of curriculum. This innovation will also stimulate the innovation of teaching behavior. It will promote the teaching and the efficiency of schools.

3. Innovation of Administrative Operation

Innovation of administrative operation refers to that the inner operation within the school is flexible and that teachers are authorized to develop of school affairs. For schools, administrative operation innovation is that school should develop some operation planning and methods. Operation plans mean that the staff build the vision of their school and be responsible to school's innovation through sharing and communication (Leithwood et al. , 2001) . Teachers are willing to face organization innovation through teamwork. And teamwork is the best support for teachers' challenging to organizational innovation.

The Relationship between Organizational Innovation and School's Efficiency

Innovation is the process to create new methods to deal with problems which could not be solved with the present methods of the organization. If the staff of schools can emphasize the innovation and encourage innovational teaching, their colleagues will have more and more innovative performances to improve school efficiency. School efficiency is achieved by all the staff, students, their parents, and the people in the community. They work together to accomplish the desired pedagogical ideals. Levine and Lezotte (1990) considers that school efficiency showed in schools' achievement of the desired objectives in school atmosphere, culture perspectives, students' learning, development of the staff, the implementation of teaching and parents' participation. Yang & Williams (1999) consider that the promotion of school efficiency requires the educational resource's influence on students' academic achievement and the improvement of faculty's working morale. Wiebe (1992) lists five indicators of school efficiencies: 1. safe and planned campus environment, 2. educational leadership, 3. specific and sound school missions, 4. students' achievement is highly concerned, and 5. the relationship between parents and school.

Many researchers point out that there is a close relationship between organizational innovation behavior and school efficiency. Lim (2002) conducts researches about the relationship between organizational learning and organizational achievement. It is found that the main variables of the relationship between the orientation of organizational innovation and organizational achievement are management innovation and technique creativity. To be more specific, the organization innovation of the management innovation and the one of technique creativity can both have positive influence upon organization achievement. Lee's (2004) research also points out that there is a close relationship between organization innovation and the promotion of school's efficiency. Hsu's (2008) research shows 1. elementary school teachers'

perceptions of school's innovation management are sound, and their perception of students' multiple performances is the soundest, 2. the stronger elementary school students' perception of school's innovation management is, the higher their perception of school's efficiency is. Hsieh's (2007) research shows that there is high positive correlation among the fitness between individuals and organizations, knowledge management, organization innovation and school's efficiency. In addition, the fitness between individuals and organizations and knowledge management can explain the variables of organization innovation significantly.

The researcher was invited to surprise some kindergartens by the Ministry of Education. He found that most of the teaching materials are simply selected from the textbooks of private publishers. The contents of these teaching materials were lack of flexibility. The teachers followed the materials without further modification and interpretation. The teaching activities could hardly inspire young children's reasoning thinking ability. Besides, they were rather counterproductive to the development of young children's creativity abilities. Therefore, after the researcher suggested the kindergarten principals to apply organization innovation to organize staff as team-work mode, conduct the innovation of curriculum and teaching according to the concept of scaffold teaching, and provide teacher with sufficient resources (including facilities and budget) to promote young children's ability to achieve holistic development. The principals of the kindergartens agreed to do conduct the organization innovations including the innovation of teaching modes, the one of teaching resources, and the one of administrative operation.

Therefore, after the researcher informed the kindergarten principals of this viewpoint, they invited tutors of classes to organize the group of curriculum innovation and break the original framework of curriculum. They designed the new curriculum and applied scaffold

teaching activities. Young children's inferring thinking ability which includes allocating, categorizing, and classifying abilities is the main topics.

The Meaning of Reasoning Ability

Reasoning refers to find out the relationship between the result and the cause through logical inference. To be specific, reasoning is the process in which one individual to apply mental activities through logical order and regulations to solve problems. Rosser (1994) points out that reasoning thinking ability is individual's ability to generate new message from the old information and develop special connections between presuppositions according systematic principles. Berk (2001) regards that reasoning thinking abilities are the factors which influence the progress of problem-solution in the course of dealing with dilemma. Individuals propose several hypotheses according these factors and examine them to find out the solution to the problem or dilemma. In addition, Wardle (2002) points out that there are five kinds of young children' logic regulation reasoning: (1) patterning: to repeat the same colors, shapes, sizes, sounds and motions, (2) classifying: to categorize things of the same characteristics, such as colors, shapes, materials, functions, and so on, (3) matching: such as one carrot fits one hole, (4) counting: to count the numbers and coins, (5) measuring: to move sand, water, or rice from one container to another. These abilities are very important for young children's acquisition of specific skills such as, observing, describing, discussing, comparing, measuring, and ordering. The young children in kindergartens begin to employ simple skills related to reasoning to observe the phenomenon of nature science (Wardle, 2002) .

Piaget (1972) points out that logic thinking ability includes three functions: (1) to find out the common category of things, to categorize the things of the same feature through sense and systematic progress. (2) to tell the difference between things by the perception of senses. (3)

quantify: compare the extension and essence of things. Essence means the nature or elements of things. Extension means the reality which the concept represents. For example, the assembly refers to the extensions. Parents and Children mean the essence.

Therefore, reasoning thinking is applying some principles generated from the known things to find out the unknown ones. Therefore, reasoning thinking activity is one mental progress of finding the relationship between cause and effect.

The Definition of Reasoning

Reasoning refers to find out the relationship between the result and the cause through logical inference. That is, one individual's ability to apply mental activities and logical progress and regulations to solving problems.

Piaget (1972) points out that logic thinking ability includes three functions: (1) to find out the common category of things, to categorize the things of the same feature through sense and systematic progress. (2) to tell the difference between things by the perception of senses. (3) quantify: compare the extension and essence of things. Essence means the nature or elements of things. Extension means the reality which the concept represents. For example, the assembly refers to the extensions. Parents and Children mean the essence. Rosser (1994) points out that reasoning ability is individual's ability to generate new message from the old information and develop special connections between presuppositions according systematic principles.

Berk (2001) regards that reasoning abilities are the factors which influence the progress of problem-solution in the course of dealing with dilemma. Individuals propose several hypotheses according these factors and examine them to find out the solution to the problem or dilemma.

Therefore, reasoning is applying some principles generated from the known things to find out the unknown ones. Therefore, reasoning activity is one mental progress of finding the relationship between cause and effect.

Related Research

Sommerville, Woodward & Needham (2005) point out that one-year-old children can comprehend the intension of other people's action. Clements, Swaminthan, Hannibal, and Sarama's (1999) study about preschool children's classifying criteria of figures find out that classifying triangles is difficult for young children. 5-year-old children can identify the right triangles better than 4. 6-year-old ones. However, more 5-year-old young children miscomprehend the figures composed of three concave or convex curves as triangles. Circles are relatively easy to identify for young children. 6-year-old young children can perform better other younger children in classifying circles, but they still miscomprehend ellipsoidals as circles. In addition, compared with the identification of circles and squares, only few children can identify squares correctly.

Mary's research, *Development of Young Children's Development of Genetic Figures* (1999), finds out that 6-year-old young children's descriptions of the definition of figures is more stable and consistent than the ones of 5-year-old young children. To elaborate it, 4-year-old and 5-year-old young children tend to be influenced and interfered in the course of tests and change their decisions. In the test of triangles, young children can not accept the varieties of triangles, such the ones with different angles, directions, and proportion.

White and Caropreso (1989) conducts a study with 24 4-year-old and 5-year-old young children as subjects to explore the effects of the training of genetic analogy problem solution's

on problem-solving. The results show that this training of analogy helps promotes students' performance of genetic reasoning in problem-solving.

Methodology

Research Methods and Designs

Quasi-experiment study method was employed to conduct the research. Only one group be tested before and after the experiment. The variables of the research are:

(1) independent variable: the scaffold teaching activities of organizational innovation.

(2) dependent variable: young children's scores reasoning abilities (including ordering, classifying and identifying) before and after the experiment and the score of the transformation.

(3) control variable: the control variable of the present study are middle shift children (including learning ability, starting points, basic mathematic ability) , teachers and the evaluator (the researcher did the individual guidance and assessment to get the consistence) , and the teaching context.

Subjects of this Study

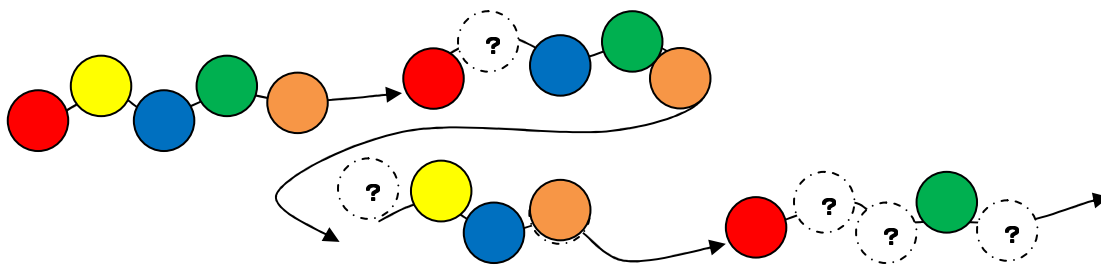
The subjects of this study include middle shift children of two classes in a private kindergarten in Yunlin County. The experimental group is composed of 24 children (11 boys and 13 girls) , while the control group is composed of 27 children (13 boys and 14 girls) .

Study Tools and Scoring

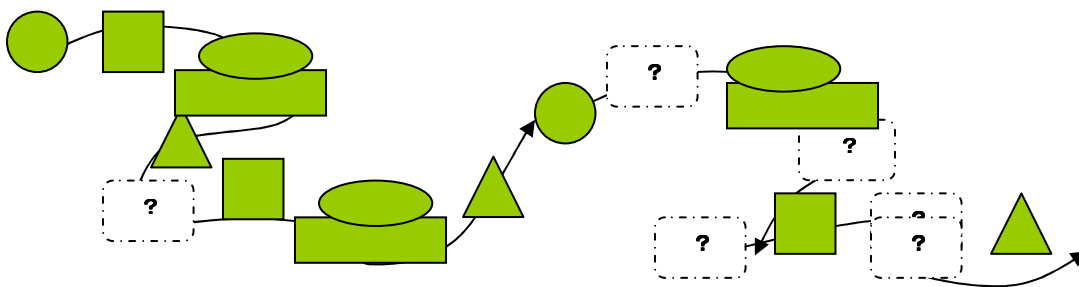
The researcher designed the tests of ordering, classifying and identifying questions composed of genetic figures as the tool of the study. Children's performance of reasoning abilities can be understood through their operation. The tool of this study is divided into four sections of items according to reasoning abilities. The participants are asked to see the picture

showed to them the earliest. Finally, pictures which lack of some figures is presented by order, the children are asked to find out the correct figure from the first section composed of the randomly allorated pictures. The scoring methods are described as follows:

(1) The figure interface is used as the pretest of one characteristic (color) : testing the ordering reasoning ability, the correct answer for each item is given 5 points, with the maximum of 30 points.

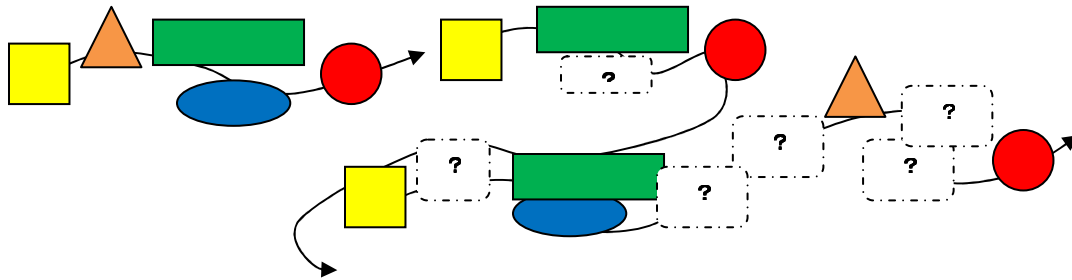


(2) The figure interface used in the posttest of one characteristic (shapes) : testing the ordering reasoning ability. If the subjects give the correct answer to one question without hints, they are given 5 points. If the subjects of the experimental group give the wrong answer earlier but give the correct answer to one question with the hints later, they are given 3 points. Those who give the correct answer after the demonstration are given 1 point.

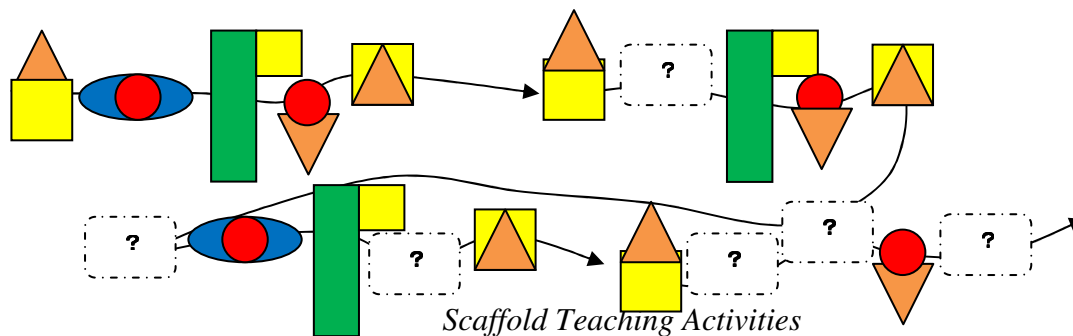


(3) The figure interface used in the posttest of two characteristics (colors and shapes) : testing the ordering reasoning and classifying reasoning ability. If the subjects give the correct answer to one question without hints, they are given 5 points. If the subjects of the experimental group give

the wrong answer earlier but give the correct answer to one question with the hints later, they are given 3 points. Those who give the correct answer for each item after the demonstration are given 1 point.



(4) The figure interface used in the posttest of three characteristics (shapes, colors, and the shapes composed of other shapes and colors) : testing the transformation reasoning ability of ordering and identifying, the correct answer for each item is given 5 points, with the maximum of 30 points.



(1) The first item is the pretest, which is to assess the ordering ability. The subjects are not informed with any hint or demonstration even when the students fail to give the correct answer.

(2) The second and third items are posttest. The second one is to assess the ordering ability, while the third one is to assess the classifying ability. If the subjects of the experimental group give the wrong answer at the first time of doing it, they will be informed with some hints. For example, they can see the colors or the shapes. If they still make mistakes, they are guided to see

the picture arranged in sequence and informed with the related colors and shapes. At last, they are asked to allocate the figures.

(3) The forth item is to asses the subjects' identifying ability and to understand the transformation phenomenon after the learning of the young children. If they fail to do it, no hints or demonstrations are provided for them.

Data Collection and Analysis

Based on the purpose of the study, the data of the pretest, the posttest, and the transformation were analyzed with SPSS 12. 0 for Windows. Pair sampling t-test was also done to examine whether the subjects' progress condition reached the significant difference.

Results and Discussion

5-1 The General Status of Performance of the Pretest and the Posttest of Reasoning Ability Young Children of Two Groups before the Teaching of Organizational Innovation

Table 5-1 shows that the mean of the pretest of experimental group children's ordering reasoning ability before the organizational innovation teaching is 19. 792. The standard deviation reaches 6. 991. And the mean of the posttest of young children's ordering reasoning ability after the organizational innovation teaching is 23. 126 with the standard deviation, 4. 703. The mean of ordering and classifying reasoning ability is 25. 333 with the standard deviation, 4. 669. Besides, the mean of the transformation of ordering and classifying reasoning ability after the organizational innovation teaching reaches 22. 917 with the standard deviation is 4. 643. Experimental group students' pretest and posttest of reasoning ability shows that young children's reasoning ability after the organizational innovation teaching is better than the one before it. And their transformation ability is higher than the ability showed in the pretest.

The controlled group children's ordering ability, ordering and classifying ability, and ordering and identifying ability are all inferior to the ones of the pretest.

Pair comparison was conducted to understand the difference between the reasoning ability of young children of two groups before and after organizational innovation teaching. Table 5-2 shows that the difference between experimental group children's ordering, classifying, identifying, and transformation reasoning ability before the innovative teaching and the one after it reaches significant standard (t values reach 5.387、4.717、and 4.307, values of them are all less than .001). Therefore, the reasoning ability of the children of experimental group (including ordering, classifying, and transformation abilities) is promoted after the organizational innovation teaching.

Table 5-1 The Mean And Standard Deviation Of Reasoning Ability Of Young Children Of Two Groups Before And After Of The Organizational Innovation Teaching

Group	Item	Reasoning ability Number	M	SD
Experimental	Pretest ordering	24	19.791	6.991
	Posttest ordering	24	23.125	4.703
	ordering and classifying	24	25.333	4.669
	Transformation ordering and identifying	24	22.917	4.643
Controlled	Pretest ordering	27	20.370	5.534
	Posttest ordering	27	20.296	4.929
	ordering and classifying	27	19.815	4.489
	Transformation ordering and identifying	27	19.444	4.870

5-2 The Analysis of the Difference between the Reasoning Ability of Young Children of Two Groups before and after Organizational Innovation Teaching

Table 5-2 Analysis Of The Difference Between The Young Children's Reasoning Ability Before And After The Organizational Innovation Teaching

Group	Pair Comparison of Reasoning Number	Difference of Mean	SD	t value
Experimental	ordering of posttest and pretest	24	3.333	3.031 5.387 ***
	classifying of posttest and pretest	24	5.542	5.756 4.717 ***
	transformation of posttest and pretest	24	3.125	3.555 4.307 ***
Controlled	ordering of posttest and pretest	27	-.074	1.155 1.000
	classifying of posttest and pretest	27	-.555	3.118 .802
	identifying of posttest and pretest	27	-.926	4.369 .440

***p<.001

5-3 The Analysis of the Difference between the Pretest and the Posttest of Reasoning Ability of Young Children of Two Groups before and after Organizational Innovation Teaching Dependent

A sample t-test was conducted to find out the difference between the pretest and the post test of reasoning ability of young children of two groups before and after organizational innovation teaching. Table 5-3 shows that the pretest of experimental group children and the one of the controlled group does not reach significant standard (t vale reaches -. 330, $p > .05$) . However, after the organizational innovation teaching, two groups' posttests of ordering, classifying, identifying, and transformation ability all reaches significant standard (t value reach 2. 096, 4. 300, and 2. 605, $p < .05$) . The experimental group's average scores are all higher than the ones of the controlled croup. Therefore, scaffold teaching of organizational innovation is efficient.

Table 5-3 Analysis Of The Difference Between The Pretest And The Post Test Of Reasoning Ability Of Young Children Of Two Groups Before And After Organizational Innovation Teaching

Before & after teaching	Reasoning Score	Number	Difference of Mean	t value	p value
Before teaching	ordering of two groups (24 ∨ 27)	-. 579	-. 330	. 743	
After teaching	ordering of two groups (24 ∨ 27)	2. 829	2. 096	. 042	*
	ordering & classifying (24 ∨ 27)	5. 519	4. 300	. 000	***
	ordering & identifying (24 ∨ 27)	3. 472	2. 605	. 012	*

* $p < .01$, ** $p < .001$

5-4 ANCOVA of the Pretests and Posttest of Two Group Young Children's Reasoning Ability before and after Organizational Innovation Teaching

The pretest scores were treated as the co-variables. Organizational innovation teaching was treated as independent variable. The posttest scores of two group young children' reasoning ability were treated as dependent variables. And One-Way Univariate ANCOVA was conducted with these variables to get rid of uncontrollable reasoning variables' influence upon young children's reasoning ability performance. Table 5-4 shows that after organizational innovation

teaching, experimental group young children's ordering, classifying, identifying, and transformation reasoning are all superior to controlled group young children's ordering, classifying, identifying, and transformation reasoning with significant standard (F values reach 40. 228, 37. 523, and 41. 852, $p < .001$). Furthermore, high percents of variation can be explained, they are 86. 7%, 59. 7%, and 67. 1%. Therefore, organizational innovation scaffold teaching can promote young children's reasoning thinking abilities.

5-5 The Correlations among All Perspectives of Young Children's Reasoning Ability before and after Organizational Innovation Teaching

To understand the correlations among all perspective of reasoning of young perspectives (including ordering, ordering and classifying, and ordering and identifying) , Pearson product-moment correlation analysis was conducted. Table 5-5 shows that correlations among every perspective of young children's reasoning ability are significant positive (r reach . 738, . 814, . 626; $p < .001$). Therefore, all the perspectives (including ordering, ordering and classifying, and ordering and identifying) of young children's reasoning are highly correlated to each other. The higher one reasoning ability is, the higher another is, and vice versa.

Table 5-4 ANCOVA of the pretests and posttest of two group young children's reasoning ability before and after organizational innovation teaching

Item	Source of variance	SS	df	MS	F	Post-hot comparisons
Ordering	Pretest (X1)	981. 225	1	981. 225	206. 113	***
Group (GRO)		133. 282	1	133. 282	40. 228	***1>2
GRO*X1		18. 484	1	18. 484	1. 181	
	inaccuracy	159. 030	48	3. 313		
	Sum after correction	1241. 922	50			
	(R ² = . 867)					
Classifying	Pretest (X1)	478. 456	1	478. 456	41. 989	***
& ordering	Group (GRO)	427. 568	1	427. 568	37. 523	***1>2
GRO*X1		35. 909	1	35. 909	. 076	
	Inaccuracy	546. 951	48	11. 395		
	Sum after correction	1412. 353	50			
	(R ² = . . 597)					

Identifying Pretest (X1) 713.043 1 713.043 22.287 ***
 & ordering Group (GRO) 185.471 1 185.471 41.852 ***1>2
 GRO*X1 .886 1 .886 .104
 inaccuracy 399.457 48 8.322
 Sum after correction 1265.686 50
 (R²= .671)

***p<.001 1 refers to experimental group while 2 refers to controlled group

Table 5-5 The correlations among all perspectives of young children's reasoning ability before and after organizational innovation teaching

Item	Ordering	Classifying and ordering	Identifying and ordering
Ordering	1		
Classifying and ordering	.738 *** 1	1	
Identifying and ordering	.814 *** 1	.626 *** 1	1

***p<.001

Conclusion and Suggestions

Conclusion

(1) Experimental group young children's reasoning abilities after the organizational innovation teaching is higher than the ones before the teaching. And their scores of transformation of the posttest are higher than the ones of the pretest. Nevertheless, the controlled group young children's posttest scores of ordering, classifying, and identifying (transformation) are lower than their pretest scores. Therefore, organizational innovation teaching can promote young children's reasoning abilities (ordering, classifying, and identifying) significantly. This is consistent with the philosophy of scaffold teaching.

(2) The scores of ordering, classifying, identifying, and transformation reasoning abilities of the experimental group young children after the organizational innovation teaching are all higher than the ones before the teaching. As a result, the promotion of reasoning abilities (including ordering, classifying, identifying, and transformation abilities) of experimental group young children comes into being after the organizational innovation teaching.

(3) After the organizational innovation, the experimental group children's posttest scores of ordering, classifying, identifying, and transformation reasoning abilities are higher than the ones of the controlled group. As a result, organizational innovation scaffold teaching is efficient.

(4) The pretest scores were treated as the co-variables. Organizational innovation teaching was treated as independent variable. The posttest scores of two group young children's reasoning ability were treated as dependent variables. And One-Way Univariate ANCOVA were conducted with these variables to get rid of uncontrollable reasoning variables' influence upon young children's reasoning ability performance.

Table 5-4 shows that after organizational innovation teaching, experimental group young children's ordering, classifying, identifying, and transformation reasoning are all superior to controlled group young children's ordering, classifying, identifying, and transformation reasoning with significant standard (F values reach 40.228, 37.523, and 41.852, $p < .001$). Furthermore, they can also explain the phenomenon highly, they are 86.7%, 59.7%, and 67.1%. Therefore, organizational innovation scaffold teaching can promote young children's reasoning thinking abilities.

(5) All the perspectives (including ordering, ordering and classifying, and ordering and identifying) of young children's reasoning are highly correlated to each other. The higher one reasoning ability is, the higher another is, and vice versa.

Suggestions

(1) Kindergartens should organize teaching innovation group to design new teaching modes, innovate teaching methods and strategies, provide with teaching resource facilities, and hold teaching demonstration to stimulate teachers' professional development. The organizational

innovation integrated with scaffold teaching should be advocated in kindergartens to develop young children's mental abilities.

(2) Kindergarten teachers should be encouraged to eliminate the use of the common teaching materials of the private publishers and develop more teaching strategies to promote the development of young children's thinking abilities.

(3) In the perspective of choosing materials, kindergarten teaching should design a variety of materials of cultivating young children's minds according to young children's potential development levels. The materials can become more advanced and extended gradually to promote young children's transformation of learning abilities.

(4) Different classes (senior classes or junior classes) of young children can be the subjects of the future studies. The design of the experiment can be more complicated to get different results.

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A STUDY OF DEVELOPING A FORM ORIGINALITY SCALE

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Abstract

This study is to develop a form originality scale which is appropriate for university design department students and to provide with some criteria for related studies and teaching realities. The development of the scale is based on creative thinking tests and product evaluation. Besides, the knowledge of form relationship concepts, thinking process and related results are integrated as well. Furthermore, the product-oriented concept is emphasized in the present study. The chief purpose of the scale is to use the five given basic figures to extend the designing of creative products and select creative forms. The first dimension is to apply non-structural design, while the second, structural design. The Form Originality Scale is proven to be feasible through empirical studies and the authentic application of teaching realities. It can also be used in further studies.

Key Words: form, form originality, form originality scale

Introduction

Background and Motivation

The introduction of White Paper on Creativity Education (Ministry of Education, 2002) points out that the twenty-first century is an age of dramatic change, the development and introduction of information technology and the diversification of the society will take place in a dramatic speed. Therefore, human being is facing the Third Industry Revolution. This revolution refers to an age of Knowledge Economy. In this age, originality thinking, critical thinking, or problem-solving will become the critical basic ability of the global citizens in the future. Originality can be considered as the process composed of knowledge production, knowledge application, and knowledge extension. As a result, originality is the origin of creativity. On the other hand, creativity and originality are related to each other. Originality is based on the application of the creative intelligence. The efficiency of originality is developed by the results of creativity.

Form designing is one of the required courses of students of design departments in universities. It is essential for building abilities of application of designing. The form designs of high originality are the professional ability as well as goal of the design departments' curriculum. In this age of Knowledge Economy, the development of form originality is of special importance.

Those who are teaching the courses of design curriculum all want to know what the form originality ability of the design department students is acquired only after learning certain parts of design. None of feasible tools for the related studies come into being up to now. This is the motivation of the researcher to conduct the present study.

Literature Review

Theoretic Base of Form

1. Definition of forms

In general, forms mean the message received by the visual organ of human beings and transferred as meaningful shapes. Specifically speaking, forms mean the interpretation of shapes through certain processes. Forms do not mean the conditions or states of the existence of objects. The behavior of building forms means creating the outlook and the inner organization. Thus, the thinking process through those who create the forms and the behaviors which create the visible, touchable items are the creation of forms (Lin, 1995).

Forming behaviors include a variety of works. The activities related with forming flat forms, three-dimension forms, objective or abstract forms can be called forming. What people call forms has the connotation of cultural tradition, social manners, and human beings' behaviors. Namely, these are meaningful creations. The key factors of human being's creation include senses, concepts, ideas, philosophies, cultures, traditions. The Chinese in Shan and Chou dynasties had developed the activities and ideas of forming creation. It is said in the Book of Change that the spiritual things are Tao, while the earthly things are implements. And Tao refers to concepts, the core principles of creation of forms. Implements are objects. They are the tools or things made in specific shape. They are designed for certain purposes (Lin, 2001).

2. Classifying of Forms

The basic classifying principles of forms are listed on Table 1.

3. Formative Fields

The fields of forms are rather wide. Their content is changing with the progress of civilization and social development. Generally speaking, all the things and activities related to

human beings' daily lives belong to the field. Formative fields can be divided into three basic categories according to functions and spatial features: visual-transmission design, industrial product design, and spatial environment design.

a. Visual-transmission forms: it is used to express the information, deepen the impression, and achieve commercial purposes. The main forms include word styles, designs, signals, CIS, advertisement, posters, covers, pictures, trademarks and POP. As the technology progresses, there are more and more varieties of the conveying forms and tools. The ancient hand-made products are replaced by printing methods, televisions, broadcasting, computers, and LACER technology. Thus, the range of the spreading of information includes all the places in the whole world. People of the world can get information with ease.

Table 1. The Basic Classification of Forms

Classifying principle	Examples of forms
From the perspective of syntax	Formative works (products and engravings) and formative creation (molding and structuring)
Form the principles of formation	Natural forms (peddles, eggs, and banks) and artificial forms (architectures, engravings, and products)
Form the principles of usage	Artistic forms (painting, engravings, and flower arrangements) and practical forms (architecture and products)
Form the principles of volume	Flat forms (paintings, photographing, and printing), three-dimension forms (engravings and products) and environment forms (gardens and city planning)
Form the principles of material	Paper forms, wooden forms, china forms, metal forms and plastic forms
Form the principles of senses	Visual forms, spatial forms, visual and audio forms
Form geographical principles	Chinese forms, Egyptian forms, French forms, and American forms
Form the principles of forming elements	Organic, genetic, spatial forms and the forms of the beams of light
Form the principles of style	Balanced, proportional, comparative, and harmonic forms

(Lü, 1984:18)

b. Industrial product forms: the functions of products are based on the engineering, aesthetics, biological, and mental factors. Their purpose is to meet the users' needs through the operations of products. The forms of products are the interfaces between human beings and products. Namely, they are the means of the communication between human beings and products. The combination of attractive appearance and complete functions of products will make the users feel comfortable and satisfied. Besides, the operation environments factors of products are important for the design. Therefore, only the ideal products with attractive appearance and complete functions can perform best in operations.

c. Craft forms: Crafts refer to the hand-made works. The focus is on the personal expression of the one who create it. It is rather different from the formulated industrial products which are produced massively. Crafts can also reveal personal styles. Sometimes, they reflect the living taste of present lives. As for the craft of folk customs, they express the local special characteristics. Crafts are the contrast of the formative art of nowadays, they still evoke the people's emphasis of traditional art (Li, 1990) .

d. Environmental landscape forms: environmental landscape forms do not represent the existence of environment. The symbolization represented by them and their surroundings are more important. The surroundings include the passengers, moving vehicles, all things near them (Lin, 1995). The purpose of environment landscape forms is to provide with ideal living space, such as the community planning, the arrangement of flowers, grass, and engravings in the park, the spatial planning of outdoor rest places.

e. Exhibition spatial forms: the place of exhibition must show the sense of beauty itself. Therefore, among the components of the formative structures of exhibition places require the elements of beauty. The people who see these places should generate the cognition and images

through the mental phenomenon of formative elements and have the feeling of relax and ease to the space of the exhibition places. The types of exhibition places include museums, shopping malls and so on.

f. Indoor spatial forms: indoor space is different from exhibition space. Indoor space is to provide with appropriate living environment. The core spirit of indoor space design is to plan space according to the habits of human beings, while the exhibition places is to meet the need of numerous audiences who complete the visit in a short time. Besides, indoor spatial design has to cooperate with inner function and the comprehensive planning of the buildings. The designers of the architectures of nowadays tend to use multiple-function spatial planning. They also make the forms of the inner spatial arrangement meet the needs of the users. It is rather important for modern people who emphasize personal tastes.

g. Building forms: building forms refer to the comprehensive design of the functions, structures, and forms of the buildings. They are mainly residences, schools, companies, factories, and stores. The form of the building has to be consistent with the surroundings and the nearby scenes to keep the harmony of the whole view. As Focillon says that building art's uniqueness is inner comprehensiveness, building art fits the space of the building and forms a unique cosmos. Indeed, the outer space will make the shape integrated with the nature. By this, sense of harmony and consistency are generated and eliminate the artificial elements (Chang, 1994).

Theoretic Base of Form Originality Evaluation Index

1. The Concept of the Relationship among Forms

The relationships among forms can be realized in the formative works in our daily lives. From the perspective of forms, the reasonability of works is conveyed through the explanation of their connotation. The diversity is the key to explain the relationships between human beings and

works. Therefore, in the course of the creations of the works, there is continual and close relationship between human being and works (Lin, 1984).

2. The Kinds of Mutual Relationships among Works of Creation

The mutual relationships between human beings and works can be viewed as the elements of the creation of works. These elements are also classified according to the need of human beings, such as sizes, ordering of sequence, materials, and functions. The mutual relationships are taken into consideration of the harmony between human beings' characteristics and the functions of the elements. Take one of the elements, color, as one example. Human beings' sense of vision and touch used to evaluate things through the reflection of perceptions and feelings. The ease of operation and functions are the main factors of meeting human beings' perception. The following table shows the perception factors and formative elements.

Table 2. Element Factors and Human Beings' Perception Elements
(Lin, 1984)

Element factors	Human beings' perception elements
Color, material	Feeling elements
Size, ordering	Action elements
Functions	Purpose elements

3. The Conceptual Framework of the Relationship between Human Beings and Works

The relationship between human beings and works is based on the conceptualization of senses, values, evaluations, methods, and functions. The rationales are elaborated as the following shows.

The objective performance of products of specific design is their out-looking. However, those are claimed to be the products with the form of originality should not be limited within the framework of outer shape. The design should be done from the dimensions of producers, users,

collector, and those who would appreciate them. Nevertheless, the types of products with specific forms are highly related to the existence of human beings. To be more specific, the difference between animals and human beings is that creativity belongs to the latter. Therefore, the creativity accompanies human beings. Human beings are always seeking beautiful forms and pleasing ones.

Besides, forms are designed through originality. There is some connection between the process of producing objective form and the ideas shown in the products. For example, people only purchase things that attract and please them and fit their practical needs as well. As the daily commodities with specific forms, their design must include practicality, safety, operational ease, and the fitness to the environment. If the products are treated as the art collections, the priorities of its design are its aesthetic function. The following figure is the five indicative of the form originality.

The relationships between human beings and the works can be hypothesized according to the structural modeling of the concepts such as ideology, value, evaluation, method, and function.

The purpose of the works of human beings is to meet personal needs in the initial stages. The ideology of the works fit the concepts of human beings best. The most basic of the concept of the works is their operation function, which hardly meet human beings' ideology. The reason is that every individual has rather different perception on the same work. Therefore, they have different criteria of judgment of works, and they generate the concept of values. From the value of the concepts of works, the generation of operation functions is necessary to act as one of the factors of the creation of the works. And one operation function should cooperate with other factors of the creation of the works of human beings (Lin, 1984).

The cooperation of the evaluation concepts, ideology, operation, value, method can be shown in Figure 1

Reality (Human being) — Sense — Value — Evaluation — Method — Function — Reality (Products)

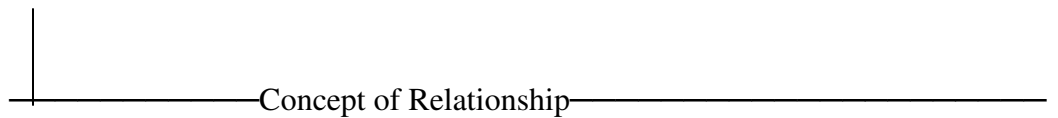


Figure 1. The Framework Figure Of The Cooperation Of The Evaluation Concepts (Lin, 1984)

The Index of Form Originality

As the concepts mentioned previously, during the creation of works of human beings, the most basic function would be considered first, then safety, operation function would gradually be considered. Finally, aesthetic function and the fitness of the environment are taken into consideration of designing.

The designers of products of specific forms should have knowledge of aesthetics and engineering, skilled techniques of design, skill of expression. The skill of creativity is one of most important elements. To design and produce a product of creative form requires the ability of applying scientific methods to evaluate the value and quality of the product.

The definitions of products of quality is not only based the designers' ideas. The quality of products is oriented from the relationship between human beings and things because the purpose of products is to provide with functions of operations. Thus, the products of specific

forms should have practicality, safety, operation ease, the fitness to the environment, aesthetic function.

The Development of Form Originality Scale

The scale was developed according to creative thinking test, the evaluation of works, and knowledge concept of relationships between forms. The process and result of thinking were both taken into consideration. Furthermore, the product-oriented concept was emphasized in the process of designing of the scale.

A. The Content of the Scale

There are two dimensions in this scale. The first one is to non-structural design, while the second one, structural design.

1. Applying five basic figures to extend the design of products of form originality

- (1) The extension of triangle-based figures
- (2) The extension of square-based figures
- (3) The extension of circle-based figures
- (4) The extension of oval-shape-based figures
- (5) The extension of rhombic-based figures

2. Selecting the forms with originality

- (1) Five kettles form which meets the index of practicality
- (2) Five cups form which meets the index of safety
- (3) Five pots form which meets the index of operation
- (4) Five vases form which meets the index of fitness of environment
- (5) Five dishes form which meets the index of aesthetic function

B. The Filling and Evaluation of the Scale

1. The first part of the scale is person basic information of the participants. They were asked to select the proper items.

2. The second part is the chief content composed of two dimensions. The first dimension is to ask the participants to draw the design form based on the application of the given figure according to their daily observation and ability. Besides, they were asked to write the

usage and characteristics. The second dimension of the scale is to ask the participants select the appropriate score from 1 to 5 to represent their opinion about the degree of originality of the given figures. The score 5 represents the highest degree, while the score 1 represents the lowest degree.

C. The Scoring of the Scale

1. The first dimension of the scale: one product design is given 1 score. Naming it is given 1 score. Writing one of its usages is given 1 score. Writing one of its characteristics is given 1 score. There is no limitation the sum of the score of each participant. The more the participants write the more scores they get. To make the scoring convenient, five parts of the scale are scored separately according to the types of the given figures.

2. The second dimension of the scale: use R. A. Likert's scoring method as the scoring method.

3. Time for answering: 120 minutes

4. The evaluation, validity, and reliability of the scale:

(1) Sampling: Purposive sampling is used in this study. The university and institute students of Applied Art and Design Department in Nan Hua University were selected as the participants. 40 university students in each grade and 20 institute students (180 as the sum) were the participants of this study.

(2) The validity of the scale: 8 experts of the related fields were consulted. The scale has ideal expert validity.

(3) The reliability of the scale: the inter-raters reliability is for the first dimension. The reliability is between .991~1.000. The Cronbach α is for the second dimension. It reaches .803.

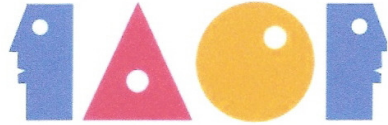
Conclusion and Suggestions

This study is to develop a form originality scale which is appropriate for university design department students and to provide with some criteria for related studies and teaching realities. The development of the scale is proven to be feasible through empirical studies and the authentic application of teaching realities. It can be used in a study of larger scales, such as the studies of more subjects in different types of schools.

The first dimension of this study is to apply non-structural design, while the second one is to employ structural design. It is suggested that more objective items can be further developed in the future studies related to this issue.

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STUDY ON THE RECREATIONAL CONSTRAINTS, LEISURE BENEFITS, JOB STRESS,
AND QUALITY OF LIFE FOR KINDERGARTEN TEACHERS

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Abstract

This study aims to discuss the tendency of recreational constraints, leisure benefits, and job stress for kindergarten teachers and further investigates the relations among them. The research subjects were the kindergarten teachers in Chiayi County and City that 400 questionnaires were distributed and 319 were retrieved with effective response rate of 79.75%. Furthermore, statistics methods, such as t-test, one-way analysis of variance, and path analysis of Lisrel, were applied to the confirmatory analysis. The findings show that (1) kindergarten teachers with distinct marriages presented different recreational constraints that married teachers appeared higher recreational constraints than single ones in the dimension of Expenditure, (2) kindergarten teachers in various age groups appeared different job stress that the teachers in the age group of 36-40 and above 41 presented higher job stress than the ones in the age group below 28 in the dimension of Teaching Methods, and (3) with the path analysis for the quality of life, recreational constraints for kindergarten teachers would directly affect leisure benefits and job stress, leisure benefits would influence the quality of life and, with job stress, indirectly affect the quality of life.

Key words: recreational constraints, leisure benefits, job stress, quality of life

Introduction

Research Motivation

Present supplementary educations have done harm to students by being over-enthusiastic about intellectual development, as the mental outgrowth of pupils is neglected. In this case, teachers who expect others to do should get rid of the concept of “Learning is the noblest of human pursuits” so that each kindergarten teacher possesses noble personality accomplishment to cultivate the pillars of the state. Moreover, kindergarten teachers should form a habit of favoring leisure activities, experience leisure benefits from those activities, and further enhance healthy quality of life from the leisure benefits. Nonetheless, with distinct life backgrounds, in which the contexts of leisure activities are different, and various personal preferences, teachers experience intrapersonal constraints, such as the psychological states of anxiety, stress, beliefs, and worries, and further influence the leisure preferences or the tendency of participation. Jackson & Dunn (1991) considered that any factors in affecting individuals not able to participate favorite or longing activities were regarded as recreational constraints. Crawford & Godbey (1987) regarded recreational constraints as the influencing factors of individual subjectively perceiving not able to join or favor the participation of leisure activities, including environments, companions, finance, and time. As a consequence, regarding the obstructive factors of kindergarten teachers participating leisure activities, this study expects to find the factors of recreational constraints in-depth and further propose the solutions so that kindergarten teachers have plenty of time and capability to take part in leisure activities. This is one of the research motivations in this study.

Recreation brings people infinite benefits; however, the goals and values pursued by individuals would generate different leisure experiences and benefits, according to individual

requirements. Leisure benefits present that, in the process of engaging in activities, a person experiences the activities and further generates benefits to the individual or the society. Presently, as kindergarten teachers are suffering from the stress from instructions, parents' expectations, and peer interactions, it is urgently necessary to look for proper recreation to release the stress. Even though recreation is an easy lifestyle for pursuing self-realization and self-satisfaction, the ultimate goal is to pursue a true life situation which individuals consider themselves having a valuable quality of life and meaningful philosophy of life. Iwasaki (2006) appraised leisure benefits that recreation could provide all kinds of people with opportunities to obtain valuable and meaningful life and further enhance the quality of life. In consequence, this study discusses the leisure benefits experienced by kindergarten teachers after participating leisure activities as the second research motivation.

For kindergarten teachers being able to constantly educate pupils and moderately unleash and release stress, the arrangement of various leisure activities could relieve the sources of stress.

Everyone presents different reactions to job stress. Some people can accept job stress, while it might result in various actions for others psychologically or physiologically so that it would cause certain positive or negative effects. The negative effects could possibly result in resignations (Tsao et al., 1995). Kuo et al. (2009) indicated that the progress of science had pushed the human life into competitions, in which psychological stress would certainly be generated. In order to adjust the life being easier, recreation has become an inevitable approach. Recently, kindergarten teachers encounter the stress of instructional management, instructional methods, interpersonal interactions, and instructional environment that they also confront difficulties psychologically. In this case, to relieve the stress for kindergarten teachers so that they could instruct pupils with full energy has become the third research motivation in this study.

Leisure participation is an important index of the quality of life for the citizens in a country that the quality of life would be enhanced with the participation of recreation. Although the development of science and technology has brought more free time for human beings, different applications of free time would result in distinct benefits. Schalock, Devries and Lebsack (1999) proposed that the quality of life were multi-dimensional that contained emotions, interpersonal relationship, materials, personal development, physiological status, self-determination, society, and rights. Mitchell (2000) considered the quality of life as the satisfaction at various demands in a period of time. Veal (2006) indicated that, because of wealth, the economic development allowed heavy investment resources in recreation, including the establishments of urban parks, playgrounds, and community sports grounds, showing that hardware facilities were a crucial index of promoting recreational sports as well as a major way to enhance the quality of life for citizens. Nowadays, in order to promote the quality of life for kindergarten teachers to make their lives full of happiness and values, the correlative factors among the recreational constraints, leisure benefits, job stress, and quality of life for kindergarten teachers should be discussed before the instructional performance. It is expected that the findings of this study would comprehend the correlation among recreational constraints, leisure benefits, job stress, and quality of life for kindergarten teachers, and further provide the governmental educational institutes with references and draft the solutions. This has become the fourth research motivation in this study.

Research Objectives

Based on the above motivations, the objectives of this study are presented as follows.

- (1) To discuss the situations of the recreational constraints, leisure benefits, and job stress for kindergarten teachers.

(2) To discuss the correlation among the recreational constraints, leisure benefits, job stress, and quality of life for kindergarten teachers

Definitions

(1) Recreational constraints. Henderson (1991) defined recreational constraints as all factors which could restrain an individual from participating leisure activities, reducing the time of participation, and obstructing the person to obtain satisfaction. Recreational constraints, in this case, imply the difficulties met by kindergarten teachers in the process of participating leisure activities so that they cannot carry out as they wish.

(2) Leisure benefits. Having the experiences of participating leisure activities, kindergarten teachers consider leisure activities as advancing motor skills, meeting new friends, and obtaining achievements from the experiences of leisure activities.

(3) Job stress. For kindergarten teachers, it is resulted from the factors of instructional environment and colleagues.

(4) Quality of life. It is resulted from the factors of kindergarten teachers affirming their abilities, interpersonal relationship, and environmental facilities.

Research Methods

Research Subjects

The research subjects were the full-time teachers in kindergartens authorized in Chiayi area. With purposive sampling, 200 people in Chiayi County and another 200 in Chiayi City were selected. Total 400 questionnaires were distributed during April 10th to May 20th, 2009 and 319 were retrieved with the effective response rate of 79.75%.

Research Tools

Organization of the questionnaire

The recreational constraints scale for kindergarten teachers refers to Crawford and Godbey (1987), the leisure benefits scale to Kao (1999), the job stress scale to Huang (2003), and the quality of life scale to WHOLOQ (1998). With Likert Scale, the higher average scores stand for higher Recreational Constraints and Job Stress as well as better experiences in Leisure Benefits and Quality of Life. The process of the organization is demonstrated as follows.

Pre-test

After the scale was organized, 250 questionnaires were distributed for pre-test and 231 were retrieved, in which 27 invalid ones were deducted and 204 were effective, with response rate of 81.60%.

Item analysis

For stricter data analyses, criterion of internal consistency and correlation analysis method were applied. The findings showed that Recreational Constraints, Leisure Benefits, Job Stress, and Quality of Life as well as the CR value for each item were less than .05 and the correlation value larger than .30, so that every item was kept.

(4) Validity analysis

After the analyses of Recreational Constraints, Leisure Benefits, Job Stress, and Quality of Life, factor analyses were preceded with oblique rotation to delete the items with two factors. The factor loading of each item in the scales was up to 0.30, so that every item was kept. Moreover, the characteristic values of various factors were larger than 1, which conformed to the requirements of factor analyses, and the explained variances of the scales were in between 61.06~68.81, showing that the scale presented favorable validity.

Reliability Analysis

The Cronbach's α of Recreational Constraints, Leisure Benefits, Job Stress, and Quality of Life scales was in between 0.93~0.97, presenting the internal consistency of this scale.

Data Processing

With SPSS for Windows 16.0 for the statistical analyses of the retrieved questionnaires, the researched problems in this study were tested with t-test, one-way ANOVA, and path analysis of Lisrel 8.72 that the significance level for each statistical test was set .05.

Conclusions and Discussion

Comparisons Of Recreational Constraints Between Kindergarten Teachers With Different Marriages

In order to compare the difference of Recreational Constraints between kindergarten teachers with distinct marriages, t-test was applied to analyze the difference of Recreational Constraints between married and single kindergarten teachers, where Expenditure Constraint presented difference, as in Table 1.

From Table 1, Expenditure in Recreational Constraints of kindergarten teachers with distinct marriages presents difference, showing that Recreational Constraints for married teachers are higher than for single teachers. In this case, married kindergarten teachers consider that their families are lack of expenditures and need to save expenses. Dattilo and Murphy (1991) summed up the factors of restraining individuals participating leisure, as (1) time, (2) finance, (3) active technologies, (4) physical capability, (5) accessibility of activities and opportunity of acquirement, and (6) social attitudes. According to the research induction, Recreational Constraints might be affected by the factors of personal work, personalities, interpersonal relationship, time management, economic problems, performance status, personal preference, and environments. What is more, in consideration of family spending, married kindergarten

teachers might save more living expenses as the economic problem is obstructed that there is not adequate money for leisure activities.

Comparisons Of Job Stress Among Kindergarten Teachers In Various Age Groups

In order to discuss the difference of job stress among kindergarten teachers in various age groups, four age dimensions were divided, as below 28-year-old, between 29-35, between 36-40, and above 41-year-old, as Table 2.

According to Table 2, the job stress for kindergarten teachers in various age groups exists in difference in Instructional Methods, where the job stress for kindergarten teachers aged 36-40 and above 41 appears higher than for the ones below 28. The findings show that kindergarten teachers with higher ages suffer more job stress in Instructional Method, as they are lack of confidence in their instructional methods and consider themselves incompetent of instructions so that they are stressed on the instructions. Contrarily, kindergarten teachers with lower ages who just graduate from colleges have learnt the latest instructional methods and are full of confidence in their instructional methods. This is considered as the possible factor of job stress for kindergarten teachers in various age groups.

Structural Equation Model Of Recreational Constraints, Leisure Benefits, Job Stress, And Quality Of Life

Hypotheses test

This study applies factor analyses to establish the observed variables for Recreational Constraints, such as Internal & External (X1), Time Management (X2), Expenditure (X3), and Leisure Facilities (X4), for Leisure Benefits, as Healthy Life Context (y1), Adjust Body-mind Disposition (y2), Promote Quality of Life (y3), and Balance Life Experiences (y4), for Job Stress, like Instructional Management (y5), Instructional Methods (y6), Instructional

Environment (y7), and Interpersonal Interaction (y8), as well as for Quality of Life, including Self Affirmation (y9), Environmental Facilities (y10), and Physical Conditions (y11), and further discuss the structural relation among the latent variables of recreational constraints, leisure benefits, job stress, and quality of life. The overall fit indices of this model present $\chi^2/df=2.83$, GFI=0.91, RMSEA =0.001, AGFI=0.87, NFI=0.99, CFI=0.93, RMR=0.049, PNFI=0.71, and PGFI=0.61, where, in addition to AGFI=0.87<.09, the rest fit indices appear in the acceptable range, where the ideal indices are quoted from Chiu (2003). It presents that the goodness-of-fit of the overall model is favorable, shown as Table 3 and the structural relation, Fig. 1.

Measurement model analysis

Composite reliability (CR) of latent variables, the composition of all measured variables reliability, indicates the internal consistency of the construct indices, where the higher reliability presents the higher consistency of the indices that Fornell and Larcker (1981) suggested to be above 0.6. From Table 5, the composite reliability of latent variables in the model is larger than 0.6 and the coefficients between 0.67~0.88, showing that the internal consistency of this model is favorable.

Average variance extracted (AVE) of latent variables calculates the explanations of the measurement variables in the latent variables, where the higher AVE presents the higher reliability and convergent validity of the latent variable, that Fornell & Larcker (1981) suggested to be above 0.5. From Table 5, the AVE of the variables in the model is above 0.5, with the values between 0.59~0.66. According to the CR and AVE of each dimension, the internal consistency of the model achieves reliability and stability.

Fit test of the basic model

Fig. 1 shows the basic fit of relation model among variables. From Table 6, the error variances are positive, with standard of mean <2.58 , the error variance t-value being significance, the absolute correlation among estimate parameters not close to 1, and factor loading not lower than 0.5 or higher than 0.95. The t-value of each dimension >1.96 reaches significance, and factor loading between 0.70-0.89, showing that the observed variable could effectively measure the latent variables with the basic fit being acceptable.

The outcomes of the structural model analysis present direct and indirect effects, where the indirect effect is having the latent independent variables with the mediation of latent dependent variables that the mediator variables indirectly affect latent variables. The direct and indirect effects of the variables are statistically analyzed as follows.

1. Recreational constraints significantly affecting quality of life does not exist that the path is .09 and t 1.01, not reaching significance, showing that the recreational constraints of kindergarten teachers do not present direct correlation with the quality of life.
2. Recreational constraints significantly influencing job stress exists, with the path .59 and t 8.58, reaching significance, presenting that the recreational constraints present direct correlation with the job stress.
3. Recreational constraints significantly affecting leisure benefits exists, with the path.20 and t 3.13, reaching significance, showing that the recreational constraints present direct correlation with the leisure benefits.
4. Leisure benefits significantly influencing quality of life exists, with the path .26 and t 4.13, reaching significance, showing that the leisure benefits present direct correlation with the quality of life.

5. Leisure benefits significantly affecting job stress does not exist, with the path $-.07$ and $t = -10.17$, not reaching significance, showing that the leisure benefits present direct correlation with the job stress.

6. Job stress significantly influencing quality of life does not exist, with the path $.14$ and $t = 1.71$, not reaching significance, presenting that the job stress does not direct correlate with the quality of life.

7. With the indirect effect of job stress, recreational constraints significantly affecting quality of life exists, with the indirect effect among variables $.08$ and overall effect $.17$, reaching significance, as shown in Table 7.

8. With the indirect effect of job stress, leisure benefits significantly affecting quality of life exists, with the indirect effect among variables $-.07$ and overall effect $.26$, reaching significance, Table 7, showing that the leisure benefits present indirect correlation with the quality of life.

It is shown that the recreational constraints for kindergarten teachers could generate favorable leisure benefits, relieve the stress resulted from instructions with leisure benefits, and indirectly affect the quality of life for kindergarten teachers.

Conclusions and Suggestions

Conclusions

This study aims to discuss the correlations among recreational constraints, leisure benefits, job stress, and quality of life for kindergarten teachers. From the research findings, the following conclusions are proposed.

(1) The recreational constraints for kindergarten teachers with distinct marriages present difference in Expenditure, showing that married teachers appear higher recreational constraints than single teachers. Obviously, in consideration of family expenses and family factors, married

kindergarten teachers cannot easily find companions with similar interests to participate leisure activities.

(2) The job stress for kindergarten teachers in various age groups presents difference in Instructional Methods that kindergarten teachers in the age groups of 35-40 and above 41 suffer more job stress than the ones below 28. This study finds that kindergarten teachers with higher ages present more job stress in Instructional Methods as they are lack of self-confidence, feel their incompetent instructions, and are therefore filled with stress.

(3) With the structural equation model analyses of recreational constraints, leisure benefits, job stress, and quality of life, the recreational constraints present direct effects on the job stress and the leisure benefits for kindergarten teachers. In other words, kindergarten teachers with higher recreational constraints appear less leisure benefits and higher job stress. Besides, leisure benefits directly affect the quality of life showing that the experienced leisure benefits after participating leisure activities would enhance the quality of life for kindergarten teachers.

Suggestions

(1) It is suggested that married kindergarten teachers should participate the leisure activities with lower or free expenses, cultivate individually preferable leisure activities with their partners, and look for commonly preferable leisure activities with the partners.

(2) Kindergarten teachers with the ages of 36-40 and above 41 are suggested to in-service training so as to take in new instructional methods to enrich their instructional methods so that they are competent with the instructions and can reduce the job stress in instructions.

(3) The following researchers are suggested to apply qualitative interviews to assist the insufficiency of the quantitative research. Furthermore, qualitative research is expected to analyze some doubts in this study.

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Table 1. T-Test Of Recreational Constraints For Kindergarten Teachers With Distinct Marriages

Item	Single teacher (n=130) Married teacher (n=189)		t	p
	Average (SD)	Average (SD)		
Internal & External	3.91(.89)	3.94(.78)	-0.35	.73
Time Management	3.19(.89)	3.28(.80)	-.96	.34
Expenditure	3.23(.91)	3.43(.80)	-2.05*	.04
Leisure Facilities	3.40(.95)	3.51(.78)	-1.13	.26

*p<.05

Table 2. ANOVA Of Job Stress For Kindergarten Teachers In Various Age Groups

Factor	Instructional management		Instructional method		Interpersonal interaction		Instructional environment		
	N	M	SD	M	SD	M	SD	M	SD
Below 28 (1)	95	3.27	.96	3.61	.92	3.85	1.04	3.51	1.05
29-35 (2)	96	3.25	.88	3.95	.83	3.79	.95	3.33	.97
36-40 (3)	74	3.24	.82	4.15	.87	3.77	.89	3.47	.86
Above 41 (4)	54	3.58	.72	4.03	.69	3.84	.87	3.52	.94
F		2.08	6.17*	.14	.69				
p		.10	.01	.94	.56				
Post hoc comparison				3.4>1					

*p<.05

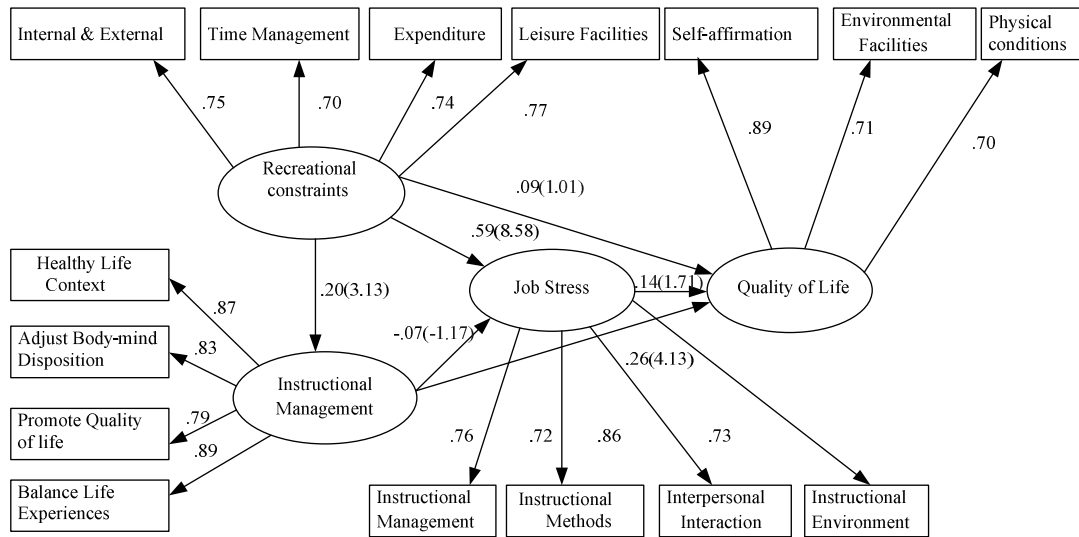


Fig. 1. Estimated outcomes of relational model
 Note: () value is t

Table 3. Goodness-Of-Fit Of The Overall Model

Degree of adaptability	Ideal indices	Research outcomes
	χ^2	Chi-square value $\chi^2=226.85$ P=0.01
		the smaller the better
Absolute fit measures	χ^2/df	P>0.05
	GFI	1-3
	RMSEA	>0.9
Incremental fit measures	AGFI	<0.1
	NFI	>0.9
	CFI	>0.9
Parsimonious fit measures	RMR	<0.1
	PNFI	0~1
	PGFI	0~1
		2.83
		0.91
		0.001
		0.87
		0.99
		0.93
		0.049
		0.71
		0.61

Table 4. Parameters Estimation Of The Overall Model

Latent variable	Observed variables	Factor loading	CR	AVE
Recreational constraints	X1	0.75	0.67	0.51
	X2	0.70		
	X3	0.74		
	X4	0.77		
Leisure benefits	Y1	0.87	0.82	0.60
	Y2	0.83		
	Y3	0.79		
	Y4	0.89		
Job stress	Y5	0.76	0.81	0.59
	Y6	0.72		
	Y7	0.86		
	Y8	0.73		
Quality of life	Y9	0.89	0.88	0.70
	Y10	0.71		
	Y11	0.70		

Table 5. Basic Fit Indices Of The Linear Relation Among Variables

Parameters	Estimate value	T-value	Standard error	Error variance	Error variance T-value
Internal & External Time Management ← Recreational constraints	0.75	-----	0.045	0.45	9.97
← Recreational constraints	0.70	14.22	0.047	0.50	10.62
Expenditure ← Recreational constraints	0.74	14.71	0.045	0.43	9.52
Leisure Facilities ← Recreational constraints	0.77	15.21	0.043	0.41	9.57
Healthy Life Context ← Recreational constraints	0.87	----- -	0.028	0.25	8.54
Adjust Physical condition ← Recreational constraints	0.83	18.72	0.031	0.31	9.86
Promote Quality of Life ← Recreational constraints	0.79	17.36	0.035	0.37	10.55
Balance Life Context ← Recreational constraints	0.89	20.72	0.026	0.21	8.02

Instructional Management	←	Job stress	0.76	----- -	0.043	0.44	10.27
Instructional Method	←	Job stress	0.72	13.23	0.043	0.46	10.63
Instructional Environment	←	Job stress	0.86	14.70	0.038	0.28	7.26
Interpersonal Interaction	←	Job stress	0.73	13.04	0.044	0.46	10.57
Self-Affirmation	←	Quality of life	0.89	----- -	0.051	0.21	4.22
Environmental Facilities	←	Quality of life	0.71	11.98	0.050	0.50	9.88
Physical Conditions	←	Quality of life	0.70	12.19	0.049	0.48	9.70

Table 6. Regression-Oriented Path Analyses

Independent variable	Endogenous variable	
	Job stress	Quality of life
Recreational constraints		
Direct effect	.59*	.09
Indirect effect	-	.08
Overall effect	.59*	.17*
Leisure benefits		
Direct effect	-.07	.26*
Indirect effect	-	.00
Overall effect	-.07	.26*
Job stress		
Direct effect		.14
Indirect effect		-
Overall effect		.14

*p<.05

INTERNATIONALIZATION ASSESSMENT OF WIND
ENERGY IN TAIWAN

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Abstract

The information of wind energy resources assessment in Taiwan basically is provided by local Taipower company or Central Weather Bureau of Taiwan. In this article, for more effective way and from globalization point of view it is suggested that wind energy resources assessment in Taiwan be involved to United Nations SWERA Programme and in collaboration with NREL. Therefore the related organizations of wind energy resources assessment under SWERA Programme such as NREL and some other renowned international entities are introduced to back up this suggestion. The steps of internationalization of wind energy assessment for Taiwan in terms of in connection or collaboration with SWERA Programme are also presented.

Keywords: Taipower, Wind Energy Assessment, SWERA Programme, NREL

Introduction

To reduce the planning time of the wind energy applications for research and industry, as well as investors risk, it is required to perform wind energy assessment in advance. One can collect long-term-recorded wind energy data and apply analytical method to calculate and predict the potential of the wind energy in a certain region. In order to understand the detailed wind data for siting any wind energy equipment, the observation data should be manipulated as statistic tables or figures. Currently the domestic wind energy assessment work in Taiwan is done only by Taipower company or Central Weather Bureau and the outcome data is rarely shared with universities. It is also noticed that under United Nations SWERA (The Solar and Wind Energy Resource Assessment) Programme, which China, South Korea and Japan has already joined in as the member of international society of solar and wind energy resource assessment, however without that of Taiwan there still lacks of integrity in wind and solar energy assessment map in the East Asia region. Therefore it is necessary for Taiwan to initiate an internationalization process of solar and wind energy assessment work in terms of in connection or collaboration with SWERA Programme.

Wind Energy Assessment In Taiwan Based On SWERA

Introduction of SWERA Programme

SWERA started in 2001 to advance the large-scale use of renewable energy technologies by increasing the availability and accessibility of high-quality solar and wind energy resource information. SWERA began as a pilot project with funding from the Global Environment Facility (GEF) in collaboration with more than 25

partners around the world. With the success of the project in 13 pilot countries SWERA expanded in 2006 into a full programme. Its expanded mission is to provide high quality information on renewable energy resources for countries and regions around the world, along with the tools needed to apply these data in ways that facilitate renewable energy policies and investments.

SWERA programme was also managed and conducted by the United Nations Environment Programme's (UNEP), and more specifically by its Division of Technology, Industry and Economics (DTIE) in collaboration with more than 25 partners around the world including the German Aerospace Center (DLR), International Energy Agency (IEA), Denmark's Risø DTU (Technical University of Denmark), U.S. National Renewable Laboratory (NREL) and National Aeronautics and Space Administration (NASA). Data set used by the SWERA technical team will include measured data from surface and upper air stations, historical ship wind observation, modeled ocean winds derived from satellite data, modeled upper air data, and topographical data. It is then employing numerical model validated with available measured data to produce wind resource data, and the results of resource and data products provided by SWERA programme were also expressed as spatial formats and produced in geographic information system (GIS) for easy visual inspection and analysis as well. Fig. 1 shows the plot of wind energy assessment results in East China , which is generated by NREL.

One of SWERA's strength is the ability that uses satellite exploration in situ measurement, numerical model and empirical/analytical images mapping to place critical solar and wind energy resource maps and data in the public domain, which

also includes basic data such as road and electricity transmission system and can merge into GIS technology to evaluate potential location.

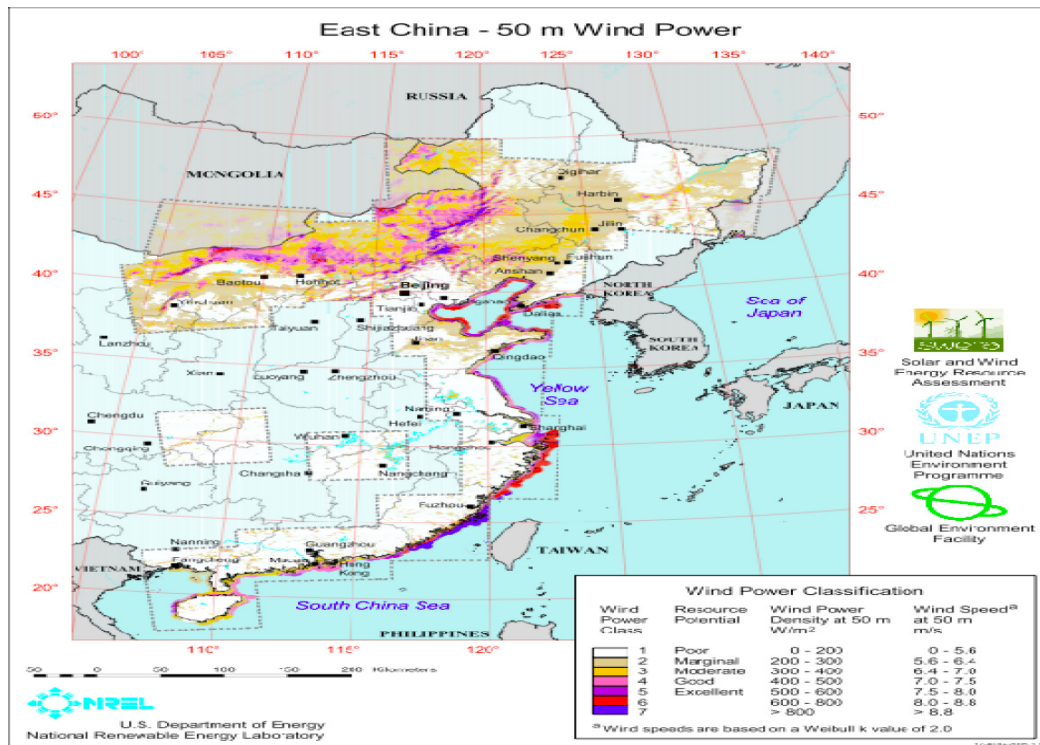


Figure 1: Sample products of assessing wind energy adapted from NREL (Source from NREL)

SWERA offers an open architecture that allows including new countries and partners, which intends to increase global coverage of high-quality wind and solar resource data and eliminate that information barrier to investment in renewable energy projects. SWERA also aims to incorporate additional resource assessment types, such as small hydro, geothermal and biomass, for use for the SWERA user community. It is apparent that as such resource assessment become well defined and widely available, the utility of SWERA database will continue to grow in geographic coverage. Several international renowned organizations related to wind energy assessment and their brief introductions are listed in Table 1.

Table 1: Several Renowned Organizations Related To Wind Energy Assessment

Organizations	Brief introductions
The National Renewable Energy Laboratory's National Wind Technology Center, NWTC, USA	Under the US Department of Energy National Renewable Energy Laboratory: National Wind Technology Center. NWTC researchers work with members of the wind energy industry to advance wind power technologies that lower the cost of wind energy through research and developments of state-of-the-art wind turbine designs.
The European Academy of Wind Energy, EAWE, Germany	The EAWE is a co-operation on wind energy R&D of research institutes and universities in seven countries: Germany, Denmark, Greece Netherlands, Spain, United Kingdom, and recently Norway. The Academy is founded to formulate and execute joint R&D projects and to coordinate high quality scientific research and education on wind energy on a European level. The members include 29 entities representing 7 EU countries and more than 80% of the long-term research activity in the field of wind energy.
Risø (Technical University of Denmark) National Laboratory for Sustainable Energy	At Risø , it focus on the following aspects of wind energy research: Wind power meteorology Aero elastic modeling Optimization and cost reduction New concepts, components and materials Wind power and the energy system Offshore wind power Wind turbine approval
DEWI, German Wind Energy Institute	DEWI GmbH founded in 1990 in Wilhelmshaven Germany for the purpose of supporting the wind energy industry services include: Site assessment: wind measurement, energy yield assessment, wind farm micro siting. Wind turbine assessment: mechanical loads, power performance, acoustic noise/vibration. Grid integration: power quality, grid calculations, grid code compliance. Due Diligence: lender's engineer, owner's engineer, project monitoring. Knowledge: research & studies, training & seminars, offshore wind energy. Consultancy: expert opinions, political consulting, conference & working groups. Accredited services: Site and area related wind energy potential assessment. Sound emission calculations for single

	<p>wind turbines and wind farms. Power curve measurements on wind turbines. Measurements of acoustic noise from wind turbine. Anemometer calibration for wind energy utilization. Power quality measurements on wind turbines. Mechanical load measurements on wind turbine and its components.</p>
ECN, Energy Research Center of Netherlands	<p>ECN develops high quality knowledge and technology for the transition to sustainable management. And ECN introduce this knowledge and technology to the market. His focus is on energy and an efficient and clean use of fossil fuels.</p>
Sandia National Laboratories, USA	<p>Sandia conducts applied research to increase the viability of wind technology by improving wind turbine performance, reliability, and reducing the cost of energy. Sandia specializes in all aspects of wind-turbine blade design, manufacturing, and system reliability.</p>
Science & Technology Facilities Council, STFC, Energy Research Unit, ERU, UK	<p>The energy Research Unit (ERU) specializes in performing and enabling innovative research on new and renewable energy technologies. The Unit, established over 25 years ago at STFC Rutherford Appleton Laboratory in Oxfordshire, has an international reputation in wind research, providing collaborative energy R&D with UK academics and industry.</p> <p>Strategic advice and information about energy R&D priorities to all major stakeholders.</p> <p>Outdoor test facilities for New and Renewable Energy Research.</p> <p>Contributions to Public Understanding of Science.</p>

Scope Of Taiwan's Wind Energy Assessment In Collaboration With SWERA

In the applications of wind energy resource development, Taiwan currently lacks of connections with other advanced countries in the aspects of assessment, equipment technology, accreditation, and standardization. It is inevitable that Taiwan will search for international corporation to create their own data and obtain other countries' experiences

and set up his national-scale system in the near future.

Therefore as to globalization of Taiwan's wind energy development, the strategy is using SWERA's products for wind energy technology solutions. To do so, it has to evaluate the feasibility of how to participate SWERA project first and then identify which specific wind energy technologies to which specific regions leading to effective uses of wind resources in siting studies and system design, thereby helping the advancement of Taiwan's wind energy development.

Accordingly, it is suggested that the proposed establishment of technology partnership agreement which being conducted and cooperated with NREL, the Taiwan side be clarified that what must be done, and check if it meets the Taiwan side proposed project parameters as follows:

- (1)Preliminary area identification: screens a relatively large region in Taiwan island wide for suitable wind energy source areas.
- (2)Determine the types and formats of the products which will be produced for Taiwan side.
- (3)Determine partners and roles and responsibilities of the cooperation agreement.
- (4)Building up the Taiwan wind energy assessment website and database as the information platform between Taiwan partners and SWERA relevant countries or members for providing related wind energy resource information to international organizations and industries.

Table 2 tabulates each partner's roles and responsibilities in SWERA project.

Table 2: Each Partner's Roles And Responsibilities in SWERA Project

SWERA Project technological partner	Roles and Responsibilities
SWERA technical team	Members of the SWERA technical team lead the resource assessments. Their combined expertise in resource assessment methodology means that countries will have the best possible regional data for use in renewable energy resource planning. The technical team will communicate their data needs to country partners, share interim results, incorporate feedback and produce final data and maps products in agreed-upon formats.
The United Nations Environment Programmers Divisions of Technology, Industry and Economics, UNEP/DTIE	UNEP fulfill the general secretariat function for SWERA and works to expand the programme's impact on global renewable energy deployment. UNEP also evaluate the programme's impact and develops and maintains programme documents. UNEP can identify which technical team members are best suited to assessment in a given region or identify new technical team members that can contribute to resource assessment efforts.
Country partners	Country partners are key participants in any SWERA project. They are responsible for collecting available measured meteorological data and spatial data sets relevant for renewable energy planning (e.g. transportation and electricity infrastructure). Country partners are also responsible for soliciting and collecting feedback from resource and metrology expert on initial products. Finally, country partners are significant to ensuring that the SWERA products reach those best positioned to use the data.

Steps For Internationalization Of Taiwan Wind Energy Assessment

Figure 2 establishes the whole framework of the operation system flow for Taiwan wind energy assessment, from which gives the basic idea of setting up the strategy and process steps for Taiwan in collaboration with SWERA Programme.

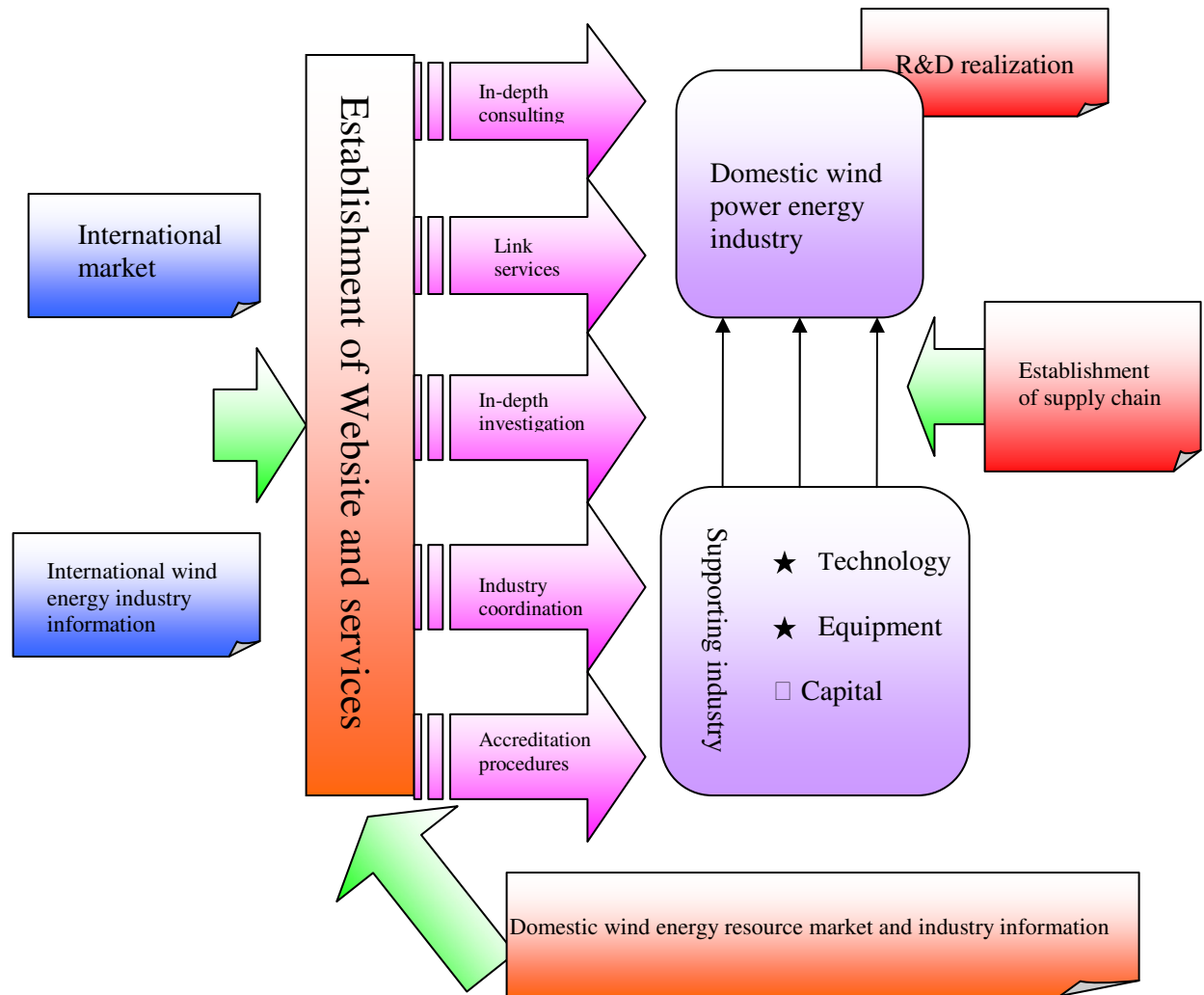


Figure 2: Framework of operation system flow chart for Taiwan in collaboration with SWERA Programme.

Referring to Fig. 2 the conduction steps of Internationalization of Taiwan wind energy assessment based on SWERA Programme can be divided in three different stages.

The first stage: investigation step

- (1) Proceeding the investigation such as analysis of international wind energy resource market and the relevant industry. It also includes the current situation of international wind energy resource market, organizations of international wind energy assessment, and

wind energy assessing items as well.

- (2) Proceeding the investigation of current situation of Taiwan domestic wind energy assessment, estimating how many wind energy assessing items that Taiwan needs, responsible organizations of domestic wind energy assessment and how to make a connection between SWERA Programme and Taiwan.
- (3) Summarizing the cooperation work items between SWERA Programme and Taiwan, building the cooperation platform between SWERA Programme and Taiwan, and identifying domestic requirements and responsibilities when in collaboration with SWERA Programme.
- (4) Visiting and Interviewing the international renowned organizations of wind energy assessment such as NREL or Denmark Risø, and establishing the cooperation relationship with them especially with NREL.
- (5) Building up the preliminary work items for preparing the international cooperation platform, and the cooperation strategies and policies of wind energy assessment for the next stage.

The second stage: conducting project step

- (1) Discussing with NREL about the scheme of helping Taiwan join SWERA project and ensure that NREL is formally commissioned to carry out the Taiwan domestic wind energy assessment service.
- (2) After completing the signature of cooperation agreement, it is then ensured that NREL and a certain team of Taiwan are both side executing organizations.
- (3) During wind energy assessment service conducted by NREL, Taiwan side is responsible to provide NREL the domestic wind energy assessment work item, and NREL is

committed to help Taiwan complete globalization of domestic wind energy assessment.

- (3) NREL must help Taiwan complete the requirement process for joining in SWERA, and join the committee of international wind energy policies.

The final stage: evaluating performance step

- (1) Regularly monitoring the NREL schedule of conducting wind energy assessment work until the accomplishment of the whole project, and then evaluate the project performance.
- (2) Continuing evaluate the performance about the project of domestic wind energy assessment supervised and done by NREL, and reviewing the problems when implanting SWERA's project in Taiwan.
- (3) Establishing the relevant data base of domestic wind energy assessment supervised and done by NREL, and building up the verification standard for domestic wind energy assessment to provide the reference index for the applications of wind energy industry.

Conclusion

In order to improve and expedite the industry invest interest for Taiwan's wind energy applications, an approach of internationalization of Taiwan wind energy assessment has been proposed. It is suitable for Taiwan to apply this approach and to participate in SWERA Programme, thus in partnership with NREL. The steps of collaboration with SWERA Programme are divided in three sequential stages and are described in the paragraph 3. The final success of the project cooperated with SWERA will depend on all the related partners' commitments and investments to the project.

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PERSPECTIVES ON ENTREPRENEURSHIP
OPPORTUNITIES AND INTERNATIONALIZATION

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Abstract

In this study, potential perspectives on entrepreneurship are considered. It concerns an entrepreneurship overview, entrepreneurship in context, entrepreneurship innovation, and entrepreneurs' benefit. Moreover, it addresses entrepreneurship and growth enterprises. This is followed by entrepreneurship opportunities. It explores government regulation, technology, change in customer demand and competition, opportunity recognition, geographically opportunity, niches' opportunity, and timing limitation. Finally, internationalization and the small enterprise are studied. A topical bibliography is provided.

Keywords: Entrepreneurship Opportunity, Internationalization.

Introduction

Potential Perspectives on Entrepreneurship

An Overview of Entrepreneurship

Enterprises today all have a beginning point in time: there must, once, have been an entrepreneur or entrepreneurial team who turned a concept into a company. There are three strategies for medium and large enterprises to remain profitable. First, they must be innovative, introducing new products to replace old products that sales growth declined and whose

profitability is threatened by competition. Second, they should abandon their least profitable product lines and their least profitable consumers and cut workers who service them. Third, they must be able to cut their costs and to get better in making their products, growing their markets by reducing prices, attracting new customers and force less efficient competitors to withdraw from the market.

The combination of dissatisfied consumers and unmotivated staff often leads to falling sales and a higher cost of each sale. Even when downsized enterprises continues to grow, it seldom accomplishes its previous growth rate. The method to preserve an enterprise's value is to introduce innovative and improved products as the old products lose their market appeal. The major innovative corporations launch new products long before sales of their existing products have increased and sometimes while the previous product is still showing strong sales growth.

The innovative enterprise depends on high staff commitment to keep its product launches on track and overcome any difficulties in their launch or development. New products require enthusiastic consumers who gain their enthusiasm from committed other staff and sales. Both large and medium sized enterprises have created organizational barriers to innovation: committees that assess projects, demanding performance targets, tight budgetary controls depended on the current product line and even deliberate overload policies. Some products are successfully championed by their inventor development engineers. Good research scientists tend to have too high a regard for literal accuracy, and too much faith in the power of reason. An entrepreneur conducts the critical decisions about the initiation and propose a project and accepts rewards for success along with the blame and punishment for failure. In the case where the entrepreneur leads a team to bring a product to a successful conclusion, the members of team are stakeholders to some extent, but motivating and managing them is usually treated as an aspect of

leadership. In some cases, the consumers exist before the new enterprise put its product on the market and they do not buy them. Sales revenue and profit are good indicators that enterprise is successful at satisfying and identifying its consumers' requirements. Successful public benefit enterprises must satisfy both their customers and their donors. Their entrepreneurs will set out their success criteria and get their donors' agreement to it fairly early in the project. Public benefit entrepreneurs always make the mistake of thinking that since their objectives are accepted and their motives are impeccable, donors are morally obliged to support them. Donors are likely to limit their support to enterprises with excellent objectives and realistic plans for accomplishing them. The financiers always declare the measures of success before committing any money to a project. Different financiers have their success criteria difference. The success criteria has two parts: the return expected on their funds and the associated schedule of interest, capital and divides repayment dates. There is also the maximum level of risk they will permit for their investment. Financers manipulate their risks by setting apparently arbitrary rules concerning the sort of projects they support and the security they require.

Entrepreneurship in Context

Entrepreneurs are a crucial force for change in developed capitalist nations. Entrepreneurs create companies by drawing together of men and resources in order to do something. When an entrepreneur's task is accomplished, economy and society will be growth. Entrepreneurs build trademarks, novel designs, trade secrets, trade dress, both un-patentable and patentable inventions, promotional materials, operating manuals and more. However, when the entrepreneur does this work, a competitor is able to reproduce it at a lower cost and get market share of entrepreneur. If an entrepreneur feel that such piracy is likely, they will have little incentive to proceed an innovation. Entrepreneurial activity shall be largely stifled in these

cultures. Enterprises in a market economy are often under pressure from other businesses, those other companies that make similar products or offer similar services. A large number of traders or enterprises compete to sell similar products, none of them have much influences over the market price. As soon as one enterprise is seen to be getting a good profit, others shall try to cut their own costs. The pressure to reduce costs is very strong. The ways to reduce costs of each products or service is to make or deliver more of them with the same number of workers, by applying better machinery or reorganizing the way the work is done. Cutting unit costs can be accomplished by producing large quantities of their product to lower the price in order to encourage buyers to take the extra supply. Enterprises with the lowest costs will survive. The sellers in one market can be the buyers in another. This will put more pressure on the surviving enterprises to cut their costs and increase their market share.

Entrepreneurship Innovation

Innovation encourages an enterprise to an opportunity to earn substantial profits and price-based competition until imitators succeed the innovator and the price-competitive cycle. Starts in markets for new product. In the same vein, innovators create new markets and introduce new products, getting substantial margins and taking on workers to satisfy growing demand. in old markets, price competition forces costs and prices down.

Generally, sufficient new enterprises arise, and sufficient new divisions are created to absorb workers displaced by progress. Workers make new products and deliver new services. Not all the new jobs are in new enterprises as some enterprises shall grow, and employ more people as well as other enterprises shall reassign staff to new duties. A modern economy is endlessly changing. Old products are replaced by newer ones, old ways of fabrication things replaced by better ones. Some divisions of large enterprises close, while new companies are

formed and new divisions are opened. Innovations involve new goods and services, new processes, or sometimes both. The entrepreneur is an enterprise creator and agent of change, a builder of organizations and teams. Very few projects are able to be completed by one person and depends on cooperation of suppliers and workers to expect issues and expedite the work. When the project is intended to introduce a new product to market, the timing of product's introduction may be critical to its success.

Entrepreneurs' Benefit

Successful entrepreneurs in one industry and culture may be less successful in another. Entrepreneurs must have ability to make decisions with uncertain outcomes, depending on the available current information. In the same vein, entrepreneurs must have the capacity to reverse decision as soon as the situation make such a critical reversal necessary. They must abandon policies suddenly if they are found to be inappropriate. Entrepreneurs may not to be specialists in their industries or to be experts in underlying science and technology, but they are required to know enough about both to take advice from real experts and recognize and reject the urgings of fraud ones. Entrepreneur's advantage is the ability to form an opinion based upon the facts. An entrepreneur should be able to contribute and lead. An entrepreneur's contribution shall regularly be based on some particular competence that sets her apart from her likely competitors. Is entrepreneurship able to taught and learned? The answer is no and yes. People whose ambitions and talents do not include building teams of people to achieve an social or economic objective can be taught to pass evaluation entrepreneurship but this will not turn them into entrepreneurs. People who recognize an opportunity and create a company to realize it are entrepreneurs. Sometimes a new company fails, because they could not have been foreseen, but far too always the failure can be traced to pure ignorance: the entrepreneur in their enthusiasm, ignored some

rule of finance, management, marketing, and accounting. Entrepreneurial education is able to spread a general recognition of the significance of innovation and entrepreneurship through the community.

There are three crucial aspects of entrepreneurship:

Entrepreneurial business planning: how do entrepreneurs prepare our project document proposal to make it intelligible to those who will review it and attractive to those whom entrepreneurs wish to join it, such as: financiers, partners, key suppliers, key employees, launch consumers and others?

Revenue forecasting: how do entrepreneurs establish revenue targets? What sales volume and marketing budget will be needed to meet these targets?

Opportunity screening: how do entrepreneurs make sure that our project has a reasonable chance of success?

An entrepreneur needs skills in:

The laws: to obey the law, right structure for the new enterprise, and intellectual property protected.

Ethics: How to keep our self-respect and the respect of our community, to create teams and building relationships.

Marketing: How to introduce product to the attention of potential consumers.

Team creation: How to procure and motivate team work.

Finance: How to measure value created by a business, to create financial operating plan, to offer potential investors, and find potential investors, as well as to confidence.

Accounting: How to apply our accounting data to manage the new business.

Entrepreneurs who know these skills before starting their new venture are not certain to succeed, but they are more able to identify, and avoid, the causes of failure. A well-structured entrepreneurial education program supports opportunities for potential entrepreneurs to test and develop their skills of leadership and planning in safe environment. Such programme always involve teamwork and team assessment. Marx suggested that as successful enterprises grew and those that failed to grow were forced into bankruptcy or taken over, and as enterprises are larger, and they are more efficient, through a better leadership of labour force, each member become more specialized. Every enterprise needs a unique entrepreneur whose influence became ineffective if the company exceeded a certain size, forcing costs up.

Entrepreneurship And Growth Enterprises

Entrepreneurs usually begin with a small business because they desire to develop their business, to accomplish growth, expand employment and grow into a medium-sized or a large enterprise. Barriers to growth for small enterprises are management and resources; motivation, as well as structure and market opportunities, a lack of management training, low qualifications, reluctance to delegate, and the need for new management skill and techniques as the organization grows; access to skilled workforce, access to finance and market growth rates; access to technology, size, as well as frequency of purchases, degree of opportunities for collaboration and segmentation or merger. The growth process of an entrepreneurial business is the ability to internationalize through an overseas operation or export. Trading overseas needs some understanding of different economies, different cultures and different ways of doing business.

Entrepreneurs who export are involved with: production at home and licensing another company to produce abroad. Entering into partnership or a strategic joint venture agreement

production at home and exporting through agents or partners. Owning and monitoring an overseas operation, through buying an existing operation.

Strategies for entrepreneurial growth depend on factors such as, cost, availability of finance, risk involved, regulations in different countries, availability of strategic partners and exchange rate risks, as well as culture of different areas and countries. Furthermore, there are fast growth information technology enterprises which have rapidly established overseas operations through expansion abroad by creating overseas offices and production facilities and operating subsidiaries as a multinational company. Factors such as the requirement to be near to their consumers and the lower cost of operating overseas are important criteria to such companies. Measurements of intangible and subjective values of different national cultures can be subject to widely different interpretations.

Advanced entrepreneurial economies feature extensive networking, their networks of friends and family in order to improve the effectiveness of these networks and to make potential entrepreneurs more aware of what they could do themselves to accomplish success. Entrepreneurs require to create strong partnerships through consumers, suppliers, competitors and other supporting institutions such as the universities, research bodies, these specialist networks build more innovation and generate synergies that support them to greater competitiveness. New entrepreneurs operate networks, for example: training, advertising, access to loan finance at advantageous rate, consultancy advice, are able to be secured when doing as part of a larger group to encourage innovation, and to develop degree of trust and co-operation in order to transfer of new ideas and new technology, as well as to strengthen the efficient operation of the network, but distrust can threaten co-operation.

Entrepreneurship Opportunities

Identifying an opportunity in the marketplace is necessary, but it is often not sufficient because entrepreneurs do not possess the necessary resources to pursue the opportunity. An opportunity may be a venture only after the resources are gathered and organized toward the attainment of the desired objective. This is a clearly creativity in entrepreneurship. To be successful, entrepreneurs must evaluate the business ideas objectively in terms of the opportunities that exist in a dynamic marketplace, and the niche ought to be defended against competitors, as well as it provide profits during the life of the business. Then, entrepreneurs acquire the necessary resources to exploit the opportunity. Examining potential sources of capital is a crucial activity, entrepreneurs must determine types of funding are available from venture capital companies, financial institutions, private investors or government programs. Entrepreneurs always face with inadequate resource to pursue the opportunity effectively. Since resources are limited the opportunity ought to be evaluated in terms of the crucial resource needed. Opportunities arise out of market changes for example: government regulations, technology, competition, changes in consumer preferences.

Government Regulation - government regulation or privatization is able to create opportunities in the market.

Technology - A technology is able to be developed in one industry and transferred to another, for example: the commercialization of products or processes developed by government laboratories. Technological advances are able to change the nature of entry barriers by providing a competitive advantage to the developer through the patent process. Change in customer demand and competition consumer behavior and demand change affect opportunity desired. Competition can affect improvements in products or services.

Opportunity Recognition - For an attractive opportunity, there must be acceptable entry barriers, a competition advantage, and profit potential. Entry barriers make entry difficult caused by technical factors and the conduct of competitors. Technical barriers come from capital resource requirement, cost advantages, or existing economies of scale. Competitor barriers are idle plant capacity, research and development expenditures, advertising expenditures, or market-share changes. In order to have a competitive advantage is the development of a distinctive competence marketing mix, organization, design, or through techniques of management. To develop competence, it composes of quality, image, flexibility, service, and location. Competency to have a competitive advantage, it should be something that is of value to buyers and that has created an awareness of company from consumer. Competitors are not able to act if the product is protected by a patent. Moreover, they should not act if the cost to act is greater than the expected benefit. Firms may realize that it is be necessary to abandon the market when its changes exceed their ability to compete effectively. Barriers discouraged an enterprise's entry into a market is little return on its investment.

Geographical Opportunities - Opportunities can be geographically specific in one city or state and may not be in another. In the same vein, an opportunity that is appropriate for some regional products may be able to expand nationally. Most national fast-food franchises are originally started as domestic restaurants. In some situations, products are special to a limited geographic region.

Niche Opportunity - To gain consumer commitment, an enterprise should able to provide product attributes or customer services that other companies can not or unwilling to provide.

Timing Limitation - There is a limited time when a competitive advantage exists. Waiting too long is able to give competitors time to respond.

Internationalization and the Small Enterprise

The UN definition of Small Enterprise is less than 500 units of labor. The popular press definition is less than 100 units of labor. The U.S. Small Business Administration's definition is it varies by industry and applies both sales revenue and the number of units of labor. Small enterprises go to international. Some companies go international by following international involvement. Some organizations are able to start as a global enterprise. They begin international operations at the same time they begin local operations.

Most small firms export only after they have a strong local base. Later, joint ventures and other forms of direct investment follow. In general, small entrepreneurs do not have the financial and managerial resources for immediate globalization.

The stages of internationalization of small entrepreneurs are as follow:

1. The firms supply international orders but do not realize that they have an international market.
2. Exporting is realized as an opportunity for new business.
3. Small businesses are finding a good domestic partner for distribution.
4. Demand of firm's product is high in a nation or region, it sets up domestic sales offices. Small enterprises must possess resources to transfer home managers to expatriate assignments or train domestic managers and workforce to run these operations.
5. Enterprises can apply joint ventures, licensing, or direct investment. This is always risk for a small company because the failed direct investment is able to put the whole enterprise at risk survival.

Global start-ups need special organizations and conditions. Demand for the product or service exists in various nations. Enterprise can move to global immediately. Enterprises should go global immediately to gain competitors' domestic markets. When an enterprise has

international presence, it is able to move quickly to cheapest sources of funds. Key skills are found in different locations in the world. Enterprises should situate wherever the best and cheapest skills are located. It is easier to start globally than to change to global later. High-tech enterprises need the large sales of global markets to cover the cost of the R&D investment.

Small enterprises also face various barriers that delay their becoming multinational enterprises. Small size always refers to limited personnel and financial resources to be international activities and a lack of sufficient produce goods services. Beside, their managers with limited international experience. Larger enterprises have a greater potential to enter markets. They possess more resources to absorb the risk of exporting. Beside larger enterprises have advantages to access more qualified individuals who can negotiate with geographically dispersed partners, and possesses more resources to invest in cross-cultural training. Such training is less for smaller enterprises with limited resources. Small enterprises lack of knowledge of domestic market. Beside they face disadvantages in competing with domestic companies that are more familiar with the domestic context and have better local connections. Fast-moving entrepreneurs are able to apply the competitive advantage of speed. Being first to market, they are able to capture significant sales before other enterprises react.

New ventures are created when an enterprise enters a new market supplies a new service or product, or technology, introduces a new method, or innovative use of raw materials. International entrepreneurship means the discovery, exploitation and evaluation of market opportunities. Another reason for seeking international entrepreneurship is that many multinational enterprises depend on entrepreneurs and small businesses to do business when entering a nation. Small enterprises are able to provide crucial products or services that are able to facilitate a multinational enterprises' entry into a new country.

Summary

Entrepreneurial Attractiveness of New Entry Opportunity

One of an important acts of entrepreneurship is new entry. New entry means: (1) to offer an established product to a new market, (2) to create a new organization, (3) to offer a new product to new market or an established market, which are able to support differentiate an enterprise from its competitors and to create challenges for entrepreneurs. *Entrepreneurial strategy* refers to the set of decisions, reactions, and actions that first generate, and then exploit over time, a new entry that maximize profit of minimizes its costs and newness. The generation of a modern entry comes from a combination of other resources and knowledge into a bundle that its creators hope will be rare, valuable, and difficult for others to imitate. Entrepreneurs expect that new entry will support the company with a sustainable competitive advantage. *Resources* are inputs for production process, for example, financial capital, machinery, and skilled employees. A highly skilled workforce is an importance resource, it concerns an organizational culture that enhances teamwork, communication, and innovation. The resources should be rare, valuable, and inimitable: Rare when it has few competitors. Valuable when it enables an enterprise to pursue neutralize threats, opportunities, and offer services and products that are valued by consumers. Inimitable when replication of resources may be difficult or costly for potential competitors Technology is valuable to consumers, novel, and unobvious, it is provided a patent, to protect the owner of the technology from offers imitating the technology.

Other intellectual property protection such as trademarks and copyrights can be protected from competition for a period of time. Knowledge is entrepreneurial resources and valuable, that can lead to the creation of a new venture with a prosperous and long life. Knowledge comes from personal experience that provided the basis for innovation. Knowledge is related to the market

and technology. *Market knowledge* means the entrepreneur's possession of the technology, information, skills and know-how that provide into a market and its consumers. The entrepreneur can share knowledge of consumers, use the performance of products. Entrepreneurs who absence of this intimate market knowledge and consumers, behaviors and attitudes, are less likely to create attractive opportunities for new products and new markets. *Technology knowledge* refers to a basis for generating new entry opportunities, the entrepreneur's possession of technology, information, know-how, and skilled.

Attractiveness of a New Entry Opportunity

Entrepreneur must evaluate whether the new product or the new market are sufficiently attractive to and be worth and developing. It depends on information of new entry and the entrepreneur's willingness to make a decision without perfect information. Market and technological knowledge create new entry potential, and evaluate the attractiveness of a special opportunity. Knowledge can be augmented by searching for information of the attractiveness of this new entry opportunity. The more information the entrepreneur has, the more accurately to evaluate whether sufficient consumer demand for the product is able to be generated and whether the product is able to be protected from imitation by competitors. Competitive advantage derives from being first movers, to introduce a new product or first to create a new market:

First Movers

First movers face less competitive competition. If first movers have assessed the opportunity. The market shall grow rapidly. Competitors will enter this growing market. First movers are better positioned to satisfy consumers. First movers have the opportunity to choose and secure the most attractive market segments, (2) position to be center of the market an increased capacity to recognize, and adapt to, changes in the market. (3) Sometimes, they can

establish their product as the industry standard. First movers receive expertise through participation to improve product, design, manufacturing, and marketing, control changes in the market that may be difficult or impossible to detect for other enterprises not participating in the market; create their networks, to provide early information about attractive opportunities. First movers are able to secure essential channels. First movers have the opportunity to develop strong relationships with suppliers and distribution channels.

First movers from a cost advantage derive from economies of scale to improve processes and products. First movers may not often prosper. It depends on: (1) the stabilities of the environment of entry, (2) the capacity of the entrepreneur to educate consumers, and (3) the capacity of the entrepreneur to erect barriers to entry and imitation in order to extend the company's lead time.

Demand Uncertainty

Demand uncertainty is difficult to estimate future demand, which has essential implications for new venture performance as both underestimating and overestimating demand are able to be negatively impact performance. Overestimating demand effects high costs and overcapacity but the market is so small. Concerning underestimating market demand, it will suffer the costs of under capacity to satisfy existing and new consumers, and losing competition, or face with additional costs for augmenting capacity. Demand uncertainty makes it difficult to estimate the key dimensions along which the market will grow. Entry barriers support the first mover the opportunity to operate in the industry for a grace period under conditions of limited competition. This grace period is the first mover's lead time. The *lead time* gives the entrepreneur a period of limited competition. During the lead time the company is able to apply marketing to define quality in the minds of existing and potential consumers. Consumer loyalty

may make it more difficult and more costly for competitors to enter the market. Uniqueness of the product may be a source of advantage over potential competitors. Intellectual property protection is able to take the form of patents, trademarks, copyrights, and trade secrets. First movers who can develop exclusive relationships with key sources of supply and key distribution channels may force potential entrants to use less attractive alternatives.

There is much evidence that publicly funded consultancy aimed at helping SMEs ameliorate their marketing capacity is shown as unsatisfactory by the client enterprises.

Publicly supported fund for SMEs is as follows:

- Friend and family members.
- Banks, lawyers, and accountants
- Semi-public agencies for example the Enterprise Agencies
- Chambers of Commerce and Trade Association

Various entrepreneurs desire to grow their businesses into public enterprises. Investors try to assess the potential growth of new businesses and returns. Policymakers need to encourage new businesses that shall augment employment. Analysts find to identify members of businesses with high potential growth. Scholars find to answers to all these questions how to grow a businesses, how much employment and profit can business generate.

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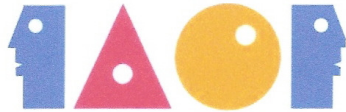
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PERSONALITY, VALUE, LIFE STYLE AND POSTMODERNISM CONSUMER BEHAVIOR: A COMPARISON AMONG THREE GENERATIONS

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Abstract

Traditionally, consumer behavior was based upon rational perspectives. Yet, the phenomenon that many consumers' behavior nowadays can not be easily reasoned gives rise to the breeding ground of post-modernism. Thereafter, the motivation of consumers has been dominated by "consumer symbolism," which clarifies purchasing products is no longer confined to the function of the products themselves. Instead, the motivation of purchasing products is piloted by product logos. In addition, post-modernism, in terms of consumption culture, pervades here and there in the modern world. The alternative terminology of younger generation becomes the most popular communicative tool. The unique culture of "Betel-nut Vendor Beauty" tremendously outlines the superficial and shallow meaning of post-modernism. The coming of the age of gender neutrality breaks traditional dualism, striding to a more diverse and harmonious orientation.

Therefore, this study aims to explore more into the phenomenon mentioned above, in the hope of manifesting 1) what impact post-modernism has on marketing and consumer behavior, 2) the meaning of the impact, 3) what change post-modernism brings to consumers, 4) which factors, lifestyle, value, and character traits, to name a few, correlate to consumers' post-modernism consumption tendency. Additionally, this study also aims to find out whether or not the post-modernism consumption tendency of consumers is related to the time and area they live in. Furthermore, the researcher hopes to detect if any difference exists among consumers of different generations and areas. This study, based upon consumers' character traits, value, and lifestyle, attempts to probe into the correlation of the three factors. Three generations are researched to testify if there's significant difference in their post-modernism consumption tendency.

This study applies 300 mailed questionnaires in which stratified sampling is used. Consumers of baby boomers, X generation, and Y generation, living respectively in northern, central, and southern part of Taiwan are targeted. In total, 284 questionnaires are answered and mailed back.

According to the result, there exists significant difference between character trait, value, and lifestyle and post-modernism tendency. What's more, there's also significant difference between different generations and post-modernism. As regards different area, there's no significant difference. Besides, post-modernism consumption tendency can be applied to predict consumer behavior.

Key words: personality, value, life style, post-modernism.

Introduction

Research Background and Motivation

Traditional consumers carry out their consumer behavior from a rational perspective. However, nowadays the consumer behavior we see cannot be explained by the rational perspective and this is the concept newly developed – Post-modernism. The starting point of all consumption is based on the so-called “consumer symbolism.” The motivation for purchasing a product is no longer limited by its function, but the implication the product symbolizes. Moreover, post-modernism can be seen everywhere in culture. The peculiar jargon spoken by the young generation becomes the most popular language. The betel nut girl uniquely seen in Taiwan best shows the implication of valuing appearance and superficialness in post-modernism culture. The upcoming of the unisex generation breaks the traditional dualism theory and has a tendency toward diversified and harmonious development.

Hence, this study tries to discuss this phenomenon and summarizes the following points as the research questions:

1. In terms of the marketing business and consumer behavior, what are the impacts and implications of post-modernism on them?
2. What is the outcome produced by post-modernism reflecting on consumer behavior?
3. What factors are related to consumers’ post-modernism consumption tendency?

4. Is consumers' post-modernism consumption tendency related to the consumers' childhood years or regions? Is there any difference in the post-modernism tendency for consumers from different generations or areas?

Research Objective

As the range post-modernism covers are broad, this study plans to focus on the marketing field. Through the discussions on relative concepts of population statistics, lifestyle, personality traits and value, a measurement model of consumers' post-modernism tendency behavior is developed. Hopefully it can provide reference for marketing personnel to use in the research of the application of post-modernism on the marketing field. In view of the above background and motivation, the main research objectives of this study are shown:

1. Review the definition and components of post-modernism and define post-modernism in marketing field and consumer behavior.
2. Try to understand the phenomena and outcomes brought by post-modernism on marketing and consumer behavior through literature review.
3. Establish a set of tools used for measuring post-modernism tendency through scale design and demonstrate it. Then discuss the possible decisive factors through questionnaire investigation.
4. Understand consumers with post-modernism tendency and their behaviors on marketing activities through empirical results.

Review of Literature

Definition and Components of Post-modernism

1. Definition of Post-modernism

The word “Post-modernism” first appeared in books of literature theory. American literary critic, Ihab Hassan, showed that “Post-modernism” was seen in some literary criticism articles in the 1930s (Shou-zhi Wang, 1998). However, the actual meaning and implication of the word was never defined and the opinions for the time of rising are widely divided. Hence, the most commonly used or seen definitions are:

Hassan (1993) explained post-modernism as “uncertain immanence.” It means post-modernism is unlike modernism which emphasizes on certainty and rationality. Hassan defined post-modernism as opposite to modern. Although it looks like post-modernism is differentiated by dualism, there are still differences between modernism and post-modernism.

Lyotard (1984) defined post-modernism as: Doubts towards “metanarratives.” It means treating scientific knowledge as linguistic games. For science that is traditionally thought as rational, people should be doubtful while keeping the model of breaking narrative knowledge in mind. People should use creative and imaginative thoughts to accept any possible uncertain and different theory or phenomenon.

Shou-zhi Wang (1998) pointed out post-modernism is “any style or a certain style after modernism. The main objective is to oppose the identity, narrate, essentialism and foundationalism of modernism. The difference is looked for but the identity is denied. The changes are looked for but the regular pattern is denied. The power is denied but new power is hoped to be formed. It is on the horns of a dilemma with contradictions everywhere.”

Based on the definitions and opinions of post-modernism from the scholars described the above, the definitions and opinions are not exactly the same. However, we can still see one similarity and that is post-modernism holds a doubtful and critic attitude towards modernism. It doubts facts, opposes rationality and criticizes consistency. It has a strong desire to get rid of the

so-called “rationality” covered by modernism and expects to view things from a creative and diversified viewpoint.

2. Components of Post-modernism

The opinions on the components of post-modernism from scholars are summarized as the following. From Hassan, he believed the components are indeterminacy, fragmentation, decanonization, self-less-ness, depth-less-ness, unrepresentable, irony, hybridization, carnvallization, participation, performance, constructionism and immanence (Xiang-fu Zheng, 1999). Baudrillard (1983) believed the components are simulation, explosion, and hyperreality. For Venkatesh (1999), the components are sign system, hyperreality, particularism and fragmentation. For Qing-zhi Li (1999), the components are duplication, double-coding, alienation and collage. For Ming-li Wen (1996), the components are promotion of individualism, anti-unification and consistency.” For Qing-song Shen (2000), the components are others (from the main moving towards the others), contrast, extrapolation and language learning.

In view of the above, the components of post-modernism can be explained essentially by three characteristics and they are uncertainty, irony and hyperreality. In terms of uncertainty, it means that people can never have a rational explanation for their own behavior. Complete contingency theory does not have a set of formula to follow. Irony means people carry out opposite behavior to fight against the strong repelling and willing-to-be released soul due to the minds that are restrained by tradition and constrained for a long time. Hyperreality is the reality world people bring themselves into for mental assurance in order to escape from the reality of material overflow. It is due to the continuous development of technology and society where people begin to feel the imbalance between material and mental status. Thus, the 11 basic

characteristics established by Hassan (1987) are used in this study as the fundamentals for measuring and discussing the post-modernism tendency.

Implication of Post-modernism on Marketing

In the book, *The System of Objects*, Baudrillard (1996) mentioned that “an object must become a symbol before it becomes the object of consumption.” A product has two sides. One is the price of the object which is the application value. The other is the price of the symbol which is the value created by the design, color, brand, relative advertisement implication and the corporation identity. Viewing from the current consumption status, we have already entered an era of symbols without knowing. Consumers establish their social status through products with symbolic implications (Song-zheng Qui-Wei and Mong-yu Lin, 2000).

The upcoming of the consumer symbolism era means people’s thinking model is slowly transformed from rational to irrational. Therefore, the 11 basic characteristics of post-modernism tendency established by Hassan are used as the principal development factors for the behavior of post-modernism tendency in this study.

1. Indeterminacy

Indeterminacy includes every fuzziness, rupture and displacement that influences knowledge and society. Indeterminacy cancels the boundary and uses underdetermination and non-partial continuity to replace it (Hassan, 1987).

When choosing a product, as there is no more the purchase principle of dichotomy, consumers would find that there are more items to be chosen from. The reason is that industry operators created many diversified products in the fuzzy zone between the two binaries. Hence, consumers advocate the potential consumer behavior that allows them to choose freely. It is all due to the upcoming of the fuzzy zone.

Based on this, the definition of indeterminacy in this study is “the tendency for consumers to consume by different means (non-fixed means) under different consumption atmosphere.”

2. Fragmentation

Hassan emphasized that every existence is in fragments and there is no integrity and people try to create unique objectives through collage, combination and sticking (Hassan, 1987). Modern consumers like to pursue new, unique and personalized products to emphasize self-taste and self-image. For example, they would rearrange and combine the clothes to show unique style. Consumers do not like to wear clothes and pants of the same style, they like to mix things and to be more creative.

The definition of fragmentation in this study is “the tendency for consumers to consume based on partial and not all product cues.”

3. Decanonization

It means breaking old principles and allowing participants to set their own rules. Therefore there is no authority constraint and there is no one to follow (Hassan, 1987). The absolute conservative thinking model in the past is transformed into the open and free thinking model nowadays. People do not have to hold themselves back and can choose to represent them in diversified appearances. Individuals in post-modernism are valued differently. Consumers do not have to accept the principles given by other people passively, they can have the product they want based on how they like it.

Based on this, the definition of decanonization in this study is “the tendency for consumers to consume without following the social mainstream.”

4. Self-less-ness, depth-less-ness

It means breaking the old self, exposing every part of it and opposing self while denying the truth behind the phenomenon (Hassan, 1987). When consumers purchase a product, the first determinant is often the style and appearance of the product. As the life cycle for modern products is not long, even for mobile phones which are function-orientated, under the appeal of fashionable appearance, they become the accessories everyone must have. It explains that modern consumers love to “play with” the item more than “understand” the item. The definition of “self-less-ness, depth-less-ness” in this study is “the tendency for consumers to consume based on the appearance or non-principal object (and not the inside or the main object).”

5. Unrepresentable

It is defined as no reality, opposing to express the true self, disliking noble and imitating while pursuing low-class and emptiness (Hassan, 1987). When purchasing, modern consumers are strict about paying attention to their own privacy and do not like to tell others their purchase intention. In bookstores in Japan, if a book is purchased, the staff would cover the book at the check-out counter to avoid others to see what the purchaser purchased. In addition, it is a taboo for the sales staff to ask the purchaser what the purchase intention is. It is the marketing trend that respects the consumption rights and should be applied everywhere.

The definition of unrepresentable in this study is “the tendency for consumers to consume using non-self (not the truth self) as the basis.”

6. Irony

It means using uncertainty and diversity as the prerequisites to represent multiplicity, diversity, desultoriness, probability or even absurdity through irony (Hassan, 1987).

In the modern culture that pursues fashion, products that are absurd, weird and unique can be often seen in the market. Consumers can satisfy their wanting-to-be different mind through

purchasing this type of products. Those products explain the diversity and inclusiveness of post-modernism. It allows consumers to purchase sub-culture or non-mainstream products without being treated differently. Hence, by saying post-modernism is going from the “mainstream” to “elsewhere (others),” Qing-song Shen (2000) tried to imply that differences must be respected. By learning and tolerating, the mainstream can co-exist with the others. The phenomenon seen in the consumption culture is no longer strange. The definition of irony in this study is “the tendency for consumers to consume based on the mentality of wanting to be different (not wanting to be the same with others).”

7. Hybridization

It emphasizes on collage and duplication to mix high-class culture with low-class culture and move between now and the past to come up with diversified subject matter (Hassan, 1987). The main appeal of modern products focuses on the function. Hence, multi-functionality becomes the main appeal modern people pursue for timeliness. The appearance of the product combination is also to satisfy consumers’ diversified needs. Once the market opportunity is discovered, the scale of a product could be extended. Moreover, many brands are moving towards diversified development in order to be different from the tradition where one brand can only have certain products. Based on this, the definition of hybridization in this study is “the tendency for consumers to have preference for products of multiple types (comparing with products of a single type).”

8. Carnivallization

It is a show of losing rationality. Through carnivallization, people can create a virtual world by overthrowing the constraints from tradition and, crossing over the boundary to make life without its order (Hassan, 1987). In terms of modern culture, only impulsion and fun are true

and affirmative. The rest are psychiatric diseases and deaths. Carnivallization uses the excuses of releasing pornography, impulsion, freedom and others to aggressively attack normal value and behavioral model (Xiang-fu Zheng, 1999). From the viewpoint of marketing, consumption is not the only way people can have products. It has the function of increasing self-confidence, expressing individual, reducing frustration and avoiding unhappiness (Faber & Ronald, 1992). Therefore, people often have crazy behavior when they are extremely happy or unhappy to release the feeling in order to gain the expressing effect. They may have the senses of achievement and satisfaction from it. Strictly speaking, the pursue of fashion is a performance of losing rationality. It only explains that the affection part of this behavior is greater than the rational part. As there is the affection part in it, people are more enthusiastic to do things they don't normally do. Based on this, the definition of carnivallization in this study is "the tendency for consumers to have preference for happy mentality (not rational and strict mentality).

9. Participation, Performance

Due to the uncertainty of post-modernism, things are inconclusive. Therefore, it welcomes everyone to take part and work together to gain results even though this kind of behavior still is inconclusive. However, it emphasizes on participation. It is a way to self-observe, self-discover and self-intoxicate (Hassan, 1987).

The creation of fashion is originally participated by groups of people. Fashion must gain group support and identity before the foundation and trend of it are established (Richard, 1976). In terms of the development and the releasing of a new product, it is first used by a small group of people and slowly accepted by the majority of people. Of course, if consumers' preference is met by the product function more, the probability of taking over the market is higher. However,

consumers with post-modernism tendency do not only care about the liking of the product, they emphasize the atmosphere of group participation.

The definition of consumers' participation tendency in this study is "the tendency for many consumers (not single consumer) to participate in the consumption decision making process during consumption."

10. Constructionism

As technology is improving day by day, the world is on its way to be designed and created by people. The sense of reality is slow disappearing and a virtual reality world is created. The application of it is based on the uncertain and amorphous concepts (Hassan, 1987). In terms of the relationship between reality and experience, Venkatesh (1999) addressed a four-stage evolution. The first stage is to carry out actual experience along with reality; the second stage is to work with the descriptions of experience and reality; the third stage is to have a symbol for the consumption reality; the fourth stage is to treat the symbol as the reality. It implies that the real world we see now is actually the virtual world consisted of symbols. The atmosphere factor is the type of virtual world that influences consumers' purchase decision (Hansen, 1972). The definition of "Constructionism" in this study is "the tendency for consumers to consume by virtual means rather than physical means."

11. Immanence

It refers to the ability of the soul and body to continue growing through symbols. It means that individual nowadays fulfills self realization and expands the ability of self development with help from language or symbol (Hassan, 1987). Consumers nowadays are different from traditional consumers whose main appeals for products are function and efficacy. Apart from the basic functions, they have the demand for symbols. It is because consumers wish

to obtain self-identity and show self-image through the consumption of symbols (Grubb & Harrison, 1967). “Symbolic Self-Completion Theory” says that consumers try to look for symbols their self-image lacks of (Wicklund & Gollwitzer, 1982). Teenagers like to purchase basketball shoes in the name of Michael Jordon as they want to have the outstanding image like Jordon on the basketball field. Based on this, the definition of immanence in this study is “the tendency for consumers to consume on the basis of satisfying internal self-demands.” The post-modernism tendency behaviors are developed and listed in the following table based on the 11 post-modernism characteristics addressed by Hassan. Please see Table 2-1.

Table 2-1. Examples for Post-modernism Tendency Behaviors

Characteristics of Post-modernism	Post-modernism Tendency Behaviors
Indeterminacy	<ul style="list-style-type: none"> ● Even for the same type of product, the consumption means for the first time and the second time are often very different. ● Individuals use different decision making means to purchase the same product.
Fragmentation	<ul style="list-style-type: none"> ● Consumers must know the product very well before purchasing. ● When purchasing a product, consumers often consider carefully and compare with others before making decision.
Decanonization	<ul style="list-style-type: none"> ● Individuals like to purchase “unique and different” products. ● Once someone else has purchased the same product, consumers would not like purchase it again.
Self-less-ness, depth-less-ness	<ul style="list-style-type: none"> ● Consumers like to purchase products with nice looking appearances and do not value the function of the product as much. ● If consumers like the product and can afford it, they would make the purchasing decision quickly.
Unrepresentable	<ul style="list-style-type: none"> ● Consumers like to consume products which are not very practical but are symbolic and have unique implications. ● Logos and marks are important factors that influence individual’s purchase decision.
Irony	<ul style="list-style-type: none"> ● When choosing a product, individuals do not like to tell others their intrinsic intention. ● Individuals like to consume products that are opposite to

	<p>the mainstream products.</p> <ul style="list-style-type: none"> ● If an individual likes the product, it does not matter if others make fun of them.
Hybridization	<ul style="list-style-type: none"> ● Individuals think less is beauty and they don't like mixed-and-matched products. ● Consumers like simple and fixed products.
Carnivallization	<ul style="list-style-type: none"> ● Consumers like to purchase interesting or even funny products. ● Individuals like to be happy, stressless and mindless when purchasing products.
Performance, participation	<ul style="list-style-type: none"> ● Consumers have the habit of gathering everyone's opinions before deciding which product to purchase. ● Consumers like to deliberate everyone's suggestions before purchasing the product. ● Shopping with friends and families are better than making decisions alone.
Constructionism	<ul style="list-style-type: none"> ● Individuals can accept product concepts that are unreal and virtual. ● Consumers think paying attention to usefulness is an old fashion concept.
Immanence	<ul style="list-style-type: none"> ● Consumers like to purchase or collect products that have particular patterns or symbols.

Research Method

Questionnaire Design

The questionnaire is designed by two experts who are majors in marketing. Pre-test is carried out to 30 subjects in the baby boom, X generation and X generation to make sure the meaning of the words applied is correct before the questionnaire is finalized. The questionnaire is divided into 5 sections: 1 – personality traits; 2 – important people, things and objects in life; 3 – lifestyle; 4 – consumption mode; 5 – consumption behavior.1. Functional definition of the concepts.

Consumption Mode

1. Indeterminacy - It is the tendency for consumers to consume differently in different consumption environment.

2. Fragmentation - It is the tendency for consumers to consume based on partial and not all product cues.
 3. Decanonization - It is the tendency for consumers to consume without following the social mainstream.
 4. Self-less-ness, depth-less-ness - It is the tendency for consumers to consume on the basis of appearances or non-principal object (and not the inside or the main object).
 5. Unrepresentable - It is the tendency for consumers to consume using non-self (not the truth self) as the basis.
 6. Irony - It is the tendency for consumers to consume based on the mentality of wanting to be different (not wanting to be the same with others).
 7. Hybridization - It is the tendency for consumers to have preference for products of multiple types (comparing with products of a single type).
 8. Carnivallization - It is the tendency for consumers to have preference for happy mentality (not rational and strict mentality).
 9. Participation, performance - It is the tendency for many consumers (not single consumer) to participate in the consumption decision making process during consumption.
 10. Constructionism - It is the tendency for consumers to consume by virtual means rather than physical means.
 11. Immanence - It is the tendency for consumers to consume on the basis of satisfying internal self-demands.
- (b) Consumption Behavior - It is the behavior consumers have toward the products, popularization, channel and price of a marketing combination.

Questionnaire Design of the Concepts

Section 1 – Consumption mode:

The questions of this concept are developed and constructed based on the 11 basic characteristics of post-modernism addressed by Hassan. In order to obtain the subjects' detailed attitude tendency regarding post-modernism, the Likert 7-point scale is used for measurement. 1= Strongly disagree; 2= Disagree; 3=Slightly disagree; 4= No comment; 5=Slightly agree; 6= Agree; 7= Strongly agree.

Section 2 – Consumer Behavior:

This concept uses the marketing 4P as the focus and the questions are composed by referring to the relative theories of 4P described in Principles of Marketing written by Kotler and Armstrong (1999). There are 23 questions and the Likert 7-point scale is used for measurement. 1= Strongly disagree; 2= Disagree; 3=Slightly disagree; 4= No comment; 5=Slightly agree; 6= Agree; 7= Strongly agree.

Samples and Sample Extraction

Stratified sampling is used by means of postage to consumers in the baby boom, X generation and Y generation in Northern, Central and Southern Taiwan. There are 300 questionnaires distributed in which there are 284 effective returned samples.

Data Analysis

Based on previous description, the statistical software, SAS, is used as the tool for analyzing the statistical data in this study. The statistical analyses used are as follow.

Table 4-1. Summary of Samples Returned

	Baby boom			X generation			Y generation		
	Number of returned samples	Number of samples distributed	Return rate	Number of returned samples	Number of samples distributed	Return rate	Number of returned samples	Number of samples distributed	Return rate
Northern	60	64	93.75%	56	56	100%	18	18	100%
Central	35	39	89.74%	34	34	100%	9	11	81.81%
Southern	32	36	88.89%	31	31	100%	9	11	81.81%

1. Descriptive Statistics

The main purpose is to understand the subjects' general outline of the concepts.

2. Inferential Statistics

It uses ANOVA, Analysis of Correlation, Factor Analysis and Cluster Analysis to carry out verification.

Empirical Results and Analysis

Construction Analysis

1. Consumer Behavior

In terms of consumer behavior, seven factors are extracted after applying Factor Analysis. The factors are “quality and service orientation,” “famous brand orientation,” “low price orientation,” “sales promotion orientation,” “promotion orientation,” “channel and service orientation” and “trial and preference orientation.” The Cronbach’ α for the factors are between 0.481 and 0.786 which shows the reliability of the scale is above standard and has a certain degree of steadiness.

2. Post-modernism Tendency

The concepts of the scale are constructed based on the 11 characteristics established by Hassan. Factor Analysis is not applied to the concepts. As shown in Table 4-5, “indeterminacy” is covered by question 1 and 2 and the Cronbach’ α is 0.760; “fragmentation” is covered by question 3 and 4 and the Cronbach’ α is 0.812; “decanonization” is covered by question 5 and 6 and the Cronbach’ α is 0.549; “self-less-ness, depth-less-ness” is covered by question 7 and 8 and the Cronbach’ α is 0.362; “unrepresentable” is covered by question 9 and 10 and the Cronbach’ α is 0.516; “irony” is covered by question 11, 12 and 13 and the Cronbach’ α is 0.557; “hybridization” is covered by question 14 and 15 and the Cronbach’ α is 0.675; “carnivallization” is covered by question 16 and 17 and the Cronbach’ α is 0.302; “participation, performance” is covered by question 18, 19 and 20 and the Cronbach’ α is 0.825; “constructionism” is covered by question 21 and 22 and the Cronbach’ α is 0.554; and “immanence” is covered by question 23.

Overall, the Cronbach’ α of the scale are between 0.302 and 0.825 which meet the lowest standard of reliability (above 0.3). Hence, the scale has internal consistency.

Correlation Analysis between the Concepts and Post-modernism Tendency

Section1. The impacts of Post-modernism Tendency on Consumer Behavior

This section mainly focuses on discussing the impacts the 11 characteristics of post-modernism tendency have on consumer behavior. Stepwise regression analysis is applied to find out the relationship.

As shown in Table 4-14, the concepts of consumer behavior are divided into “quality and service orientation,” “famous brand orientation,” “low price orientation,” “sales promotion orientation,” “promotion orientation,” “channel and service orientation” and “trial and preference

orientation.” Stepwise regression analysis is applied to each of these concepts with the 11 characteristics of post-modernism tendency.

“Participation, performance” is the most obvious characteristic that explains post-modernism tendency. “Famous brand orientation” and “channel and service orientation” are the two consumer behavior concepts that have post-modernism tendencies. Detailed analysis results are summarized in Table 4-14.

Section 2. Difference Analysis of Post-modernism Tendency for Consumers of Different Generation and Region.

This section mainly focuses on discussing consumers from three generations (baby boom, X generation, Y generation) and three regions (northern, central, southern region) and whether or not their post-modernism tendencies would be significantly different due to differences in generation and region. One-way ANOVA is applied to carry out tests for consumers from three generations and three regions. The analysis results are shown below:

1. Differences in Post-modernism Tendency for Consumers from Different Generations

Table 4-14. Stepwise Regression Analysis Results for the impact of Post-modernism Tendency on Consumer Behavior

Dependent variable Variable Independent Variable	Quality and service orientation	Famous brand orientation	Low price orientation	Sales promotion orientation	Promotion orientation	Channel and service orientation	Trial and preference orientation
α	6.977***	2.304***	3.115***	1.589***	2.766***	2.452***	4.581***
1 Indeterminacy				0.148***			
2 Fragmentation	-0.306***					-0.115***	
3 Decanonization						0.153***	
4 Self-less-ness, depth-less-ness		0.107**			0.303***	0.182***	
5 Unrepresentable		0.256***				0.126***	
6 Irony							-0.119**
7 Hybridization	-0.112***						

8 Carnivallization			0.132*				0.110**
9 Participation, performance		0.095**	0.234***	0.157***			0.204***
10 Constructionism		0.098**		0.274***		0.097*	
11 Immanence							
F value	51.33	21.77	10.80	17.04	16.50	17.94	13.80
P value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
R ²	0.2962	0.2646	0.0813	0.1738	0.0631	0.2712	0.1455

Note:* : $p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$

Table 4-15. Difference Analysis Result of Post-modernism Tendency for Consumers from Different Generations

dependent variable / independent variable	Model F	P value	Baby Boom Mean	X Generation Mean	Y Generation Mean
1 Indeterminacy	1.35	0.261	3.804	3.899	4.208
2 Fragmentation	14.44	0.0001***	2.699 (L)	3.515 (H)	3.208
3 Decanonization	6.99	0.001***	3.207 (L)	3.530	4.071 (H)
4 Self-less-ness, depth-less-ness	2.28	0.104	3.295	3.530	3.750
5 Unrepresentable	1.56	0.211	3.757	3.861	4.194
6 Irony	1.09	0.336	3.535	3.585	3.843
7 Hybridization	3.79	0.024**	2.752 (L)	3.134 (H)	3.111
8 Carnivallization	1.17	0.311	4.411	4.534	4.708
9 Participation, performance	1.52	0.220	4.312	4.206	4.630
10 Constructionism	4.37	0.014**	3.009 (L)	3.377	3.597 (H)
11 Immanence	1.69	0.186	3.602	3.843	4.083

Note:* : $p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$

As shown in Table 4-15, among the 11 characteristics of post-modernism tendency, four

of them are significantly different for consumers from different generation. The characteristics are “fragmentation,” “decanonization,” “hybridization” and “constructionism.” Comparing with consumers in the X generation and Y generation, consumers in the baby bloom are the ones that do not show post-modernism tendency.

Conclusion and Suggestions

Conclusion

Based on the results of the analyses in the prior sections, conclusions are drawn and summarized in this section in the order of Factor Analysis, Descriptive Statistical Analysis and Research Hypotheses (including correlation analysis, ANOVA and stepwise regression analysis).

1. Factor Analysis

Factor Analysis is performed on each of these five concepts: personality traits, value, lifestyle, consumer behavior and post-modernism tendency. The Cronbach' α of these five concepts are all greater than 0.365 which means the reliability of the scales has a certain degree of steadiness (Cronbach' $\alpha > 0.3$).

2. Descriptive Statistical Analysis

In terms of post-modernism tendency, most of the subjects show insignificant level of it. In terms of consumer behavior, the analysis shows that “quality and service orientation” and “trial and preference orientation” gained general recognition. In other words, when consumers carry out consumer behavior, they still value the product quality, sales service and after service; before they purchase a product, they would use the trial sample first in the hope to have more experience and understanding of the new product.

Suggestion and Contribution

1. Suggestion and Contribution for Follow-up Research

(a) Try to give a clear definition and characteristic of the word “Post-modernism”

The definition of the word “Post-modernism” established by scholars is widely divided and the characteristic of it is different according to different opinions the scholars have. Hassan’s 11 characteristics of post-modernism are used to derive the implications of consumer behavior and are cited by other scholars. However, if different definitions or characteristics are adopted by other researchers, the research results would be different. Hence, follow-up researchers must find the best definition and characteristics of post-modernism to stabilize the research direction.

(b) Enhance the viewpoint of post-modernism in terms of marketing

Post-modernism was a theory developed in the perspectives of literature, arts and philosophy. Hassan’s 11 characteristics extracted in this study are also from the theory. There are not many researches related to the literacy part of post-modernism let along the application in the marketing field. Hence, in terms of post-modernism consumer behavior, this study is the exploratory research. Hopefully this study can have the effect of breaking the ice and the discussion and research of post-modernism in terms of marketing by follow-up researchers can be increased so that the trend of consumer behavior can be grasped better in the era of consumer symbolism.

(c) Enhance the measurement tool of post-modernism tendency

Hassan’s 11 characteristics of post-modernism are used to develop the measurement scales in this study. Follow-up researchers can establish measurement scales according to the characteristics addressed by experts with public credibility in order to compare with or modify the scales of this study. Hopefully a measurement tool that is more appropriate for post-modernism tendency can be established to make it more reliable and creditable externally.

(d) Cross analyze the concepts in this study that have post-modernism tendency

Follow-up researchers can perform correlation analysis between personality traits, value and lifestyle that have post-modernism tendency and the concepts of consumer behavior. Marketing staff can then carry out detailed marketing 4P to consumers that belong to the above categories. (Note: The consumer behavior scale of this study is established from the framework of marketing 4P)

(e) Carry out further research and verification to the topics addressed in the discussion.

2. Suggestion and Contribution to Practice Field

As previous section described, although the consumers with post-modernism tendency are contradictory, fragmented, sometimes rational and sometimes irrational, it is found that the post-modernism tendencies for consumers of different generation, personality traits, value and lifestyle are significantly different. In other words, when carrying out marketing researches related to groups with post-modernism tendency in the practice field, the analysis results of the four concepts described above can be considered to begin with. Hopefully the consumer behavior for consumers with post-modernism tendency can be grasped more definitely.

The following shows the specific marketing strategies for consumers who have the most post-modernism tendency under each concept.

(a) Personality traits

Consumers who have “conservative and anxious tendency,” “fashionable and open tendency” and “incautious tendency” are the groups of people who have post-modernism tendency. In terms of consumers who have conservative and anxious tendency, non-mainstream or unique products suit their fancies. Moreover, by making group consumption image or guiding them with groupthink can also catch their consumption mood. In terms of consumers who have fashionable and open tendency, business owners can design products that have symbolic

implications or humanistic appeals, especially products with nice or unique appearances, to attract those consumers. However, for consumers who have incautious tendency, consumption atmosphere that is relaxing and free-thinking must be created and the onsite service staff should provide consultation on their own initiative. Moreover, the product design should focus on nice appearances which can be represented by advertisements or wordings.

(b) Value

“Youth and appearance value” is the concept that has most post-modernism tendency. For this group of people, products that are unconventional and nice looking and have unique meanings can attract them the best. Marketing staff can use the atmosphere created in the advertisement to give the products special meanings. In addition, consumers of this group value peer relationship very much. Hence, creating a theme that is recognized by peers can catch their attention which is a very important marketing start point.

(c) Lifestyle

“Fashion and foreignism worshipping concept” is the concept with the most post-modernism tendency. Consumers with this lifestyle like to use foreign and fashionable products to show they are leading the fashion. Business owners can hire foreign idols to be the product spokesmen. The product content should be shown in foreign languages and famous foreign cities can be used as the background.

(d) Consumer Behavior

“Famous brand orientation” and “channel and service orientation” are the concepts with the most post-modernism tendencies. Consumers that are under famous brand orientation are especially particular about the appearance and that delicate packaging is the most popular. They also like products with brand symbolism. They prefer collective bargaining or consuming

together to obtain identification or to show off to friends. They also like products that come in virtual forms. Hence, marketing staff can use high price or political celebrities as the market division to promote the brand status and imply that high technology means high standard to enhance the rank of virtual products.

For consumers under channel and service orientation, they often purchase desired products based on the channel. It is very different from the general population who often decide what to buy first and the channel later. Therefore, for these consumers, the positioning of the channel itself must be very clear and definite. The store arrangement must be in accordance with the characteristics of the product and it is better represented as a main theme. For example, franchised stores must have the unique franchised store style; convenient stores must have convenient goods; department stores are the channels for high-class products. By doing so, the channel attribute can have effects on consumers of this type.

(e) Generation Difference

Apart from consumers in the baby boom who have the least post-modernism tendency, the means for consumers in the X and Y generations regarding “fragmentation,” “hybridization,” “decanonization” and “constructionism” are the highest. In terms of consumers in the X generation, marketing staff can gain their responses through media means that are fragmented and reasonless. As for the product design, the more diversified choices provided means the better they respond. In terms of consumers in the Y generation, the uniqueness of the product can be enhanced to create an atmosphere that is new and unconventional to allow them to have the sense of superiority of being different. Moreover, as the Y generation likes to surf on the internet, the products can be transacted by virtual means and the website should be cool and fashionable in order to be eye catching.

The marketing strategies described above are the viewpoints addressed by this study regarding the research results. They are only for reference. Detailed problems await follow-up researchers to solve in order to allow marketers to understand and grasp post-modernism tendency more. Hopefully effective marketing strategies can be established subsequently to correspond to the problems.

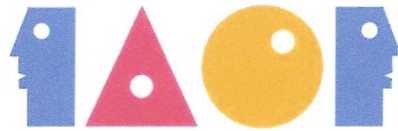
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A STUDY OF THE RELATIONSHIP AMONG THE COMPENSATION
MANAGEMENT, OPERATIONAL MANAGEMENT
AND ORGANIZATIONAL CLIMATE

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Abstract

When a compensation management pattern featuring an industrial harmony is created to cater to employees' needs and to aggregate centripetal forces, an enterprise is then competent to deliver expected performances archived by fully utilized manpower values within a more flexible management system. Thus, under the win-win condition of sides, the labors or the employers, the reasonable compensation management, good corporate culture and good Organizational climate are centripetal forces to the employees. Apart from that, the flexibility, efficiency, the performance and the competence advantage are improved. This paper made research on the integrity of compensation management, operation performance and Organizational climate. Also, the relevance among each variable is testified.

The research is based on the empirical study of Taiwan Fusing Industrial Co. With the analysis of one-way ANOVA and regression analysis, each variable meets significant level. The empirical analysis shows that different Organizational climate has significant difference on compensation management and operation performance, and on compensation management. Organizational climate and operation performance. Finally, the research hopes that based on the results, some suggestion and reference on the theoretical development and compensation management of international corporations have been put forward.

Keywords: Compensation Management, Corporate Culture, Climate, Efficiency, Performance

Introduction

With the dual effects of globalization and the industrial competence, international corporations face challenges of global crisis, rising raw material price and man power cost as well as tax which influence market supply. Thus, under the tough circumstance, corporations consider pursuing best performance as their priority. The conditions of operation performance reflect operation results. Therefore, the result of operation performance motivates staff to work hard towards goals and directions and improves corporation's performance. As for how to motivate staff to create values for corporations, the most frequently used method is salary, which is the controllable part of operation performance. As for how to know staff's feelings towards Organizational climate, the method is Organizational climate which is helpful for corporations to understand staffs' behavioral feelings and the condition for improvement of compensation management.

Corporation needs to know more about Organizational climate, which traditional researches do little study with human resources. However, recently, scholars Bowen and Ostroff (2004) consider that Organizational climate is the important variable between human resource practice and operation performance. Thus, related researches on this point are the key researches in the future. The essay needs to know how staff performance influence operation performance when international corporations with inseparable relationship between corporation and staff facing global competitions and the staff performance and management system directly influences operation performance. In the future, compensation management, staff's feelings towards organization management and corporation culture need to be double checked. Depending on shared values, consensus management is reached. By using these core staff in the organization, a corporation can take advantage in this changing market.

Literature Review

Compensation Management

The so-called salary means the payment that a corporation offers to the staff. Based on the clear explanation of Labor Standards Act Article 2, salary is the payment of labors for their work. There are some definitions for salary based on different scholars. Uen and Chien (2004) put forwards that salary is the award corporation used as the incentive to the staff. There are lots of researches on the relevance between compensation management and the operation performances. For example, Artis, Backer and Huselid (1999) found that compensation management incentive staff to reach organization purposes. The above shows that either financial factors or non-financial factors, compensation management has close relevance with operation performance. Delaney and Huselid (1996) pointed that compared to other human resources management method; compensation management is more effective in influencing corporation performance. In 1964 Vroom's expectancy theory highlights the mandatory combination of compensation management and operation performance. That is, good compensation management system motivates hard work so that good performance is shown and good salary is obtained in return. compensation management can efficiently motivate staff and combine improved staff performances and corporation advantages. Human resource should use compensation management to attract and retaining talent so that unique human resources advantages can be maintained.

Operation Performance

The society is changing unpredictably. The corporation management factors are changing in line with the changing environment. Thus, during the aim pursuing, efficiency maintenance and flexibility process, the ultimate aim of the organization operation is the performance. Only with

the improvement of productivity, profitability, growth rate and corporate image, a corporation can survive and develop. Guo Jianliang (2003) holds that performance means the degree of the goal which a corporation or an organization has made. Fan Chiwen (2004) holds that operation performance means the actual practice and result of an organization. In simply words, an organization with efficient performance can make efficient use of resources to satisfy staff needs, to obtain established goal and to adapt to outer changes. Guo Minghua (2009) holds that operation performance is the reflection of the achievement of operation activities, which include revenue creation, cost control and the reflection of the achievement.

Lawrence & Lorsch (1969), Katz & Kahn (1978) once put forward an agreed definition. They holds that agreement must reached among salary system, organization frame and management decision. That is, cooperation among each factor can achieve the best operation performance. Gerhart & Milkovich (1990) figure out that with the practice of the strategy of salary varying with performance, i.e. the use of performance-related pay system, the performance of a corporation is improved. Covin & Slivin (1991) hold that for the researches on measurement of corporations' performances, as corporations are unwillingly to offer writing financial reports, the majority of the researches evaluate financial factors by questionnaires. Thus, the research considers financial performance as the evaluation standards based on evaluation on operation performance. The used Walker & Ruekert (1987) here are the most frequently used factors by research to evaluate organization performance, mainly include financial efficiency, growth rate and profitability which are the baseline for evaluation the overall performance of a corporation.

Organizational Climate

As for corporations' regulations, except those stipulated clearly, the efficient achievement of organization goals by staff performance depends on staff's understanding and feeling towards

Organizational climate. The good Organizational climate may improve the members' attitude and behavioral performance. Recently, scholars Baer & Frese (2003) consider that Organizational climate only focuses on those observable and concrete behaviors. Mathisen, Torsheim & Einarsen (2006) hold that Organizational climate originates from organization members under the same working environment. After the accumulation period, organization members reflect and share their points on the same thing. In simply words, Organizational climate is the personal feeling towards Organizational climate by personal value.

Dessler (1976) considers organizational climate as the organization aim or the concrete bridge linking staff morale and behaviors. Besides, based on staff's reflection on structure, leadership and rules, it provides references on the improvement of Organizational climate to the managers. Organizational climate originates from the thought researches on organization members' motives and behaviors. The understandings and feelings towards organization have influences on the obtaining of organization goals. Therefore, Organizational climate plays essentially important part in corporation management. Managers can make use of Organizational climate to grasp motivated action, to improve organization behavior pattern and to improve staff's positive behavioral action in order to efficiently obtain organization goals.

*Different Organizational Climate Has Significant Difference On
Compensation Management and Operation Performance*

Liu Xiangshang (1990) points out that the success and the failure of a corporation have indispensable relationship with productivity and staff's attitude. Organizational climate, which involves staff needs, compensation management, working environment, promotion opportunity, benefits, and interpersonal relationship and so on, influences all staff's attitude. Zhao Haitao (1993) considers the key challenge of a corporation is to create appropriate Organizational climate and the establishment if compensation management so that improve operation

performance in the dynamic and changing environment. Therefore, Organizational climate has close relationship with operation performance. Some scholars such as James & Jones (1974) and Gerhart & Milkovich (1990) hold that compensation management is one significant facets of Organizational climate. Apart from that, Slater & Narver (1995) put forward that if corporations want to display the best operation performance, it is not enough to rely solely on marketing guidance. Instead, it needs to combine marketing guidance and compensation management as well as appropriate Organizational climate.

There Is Significant Difference on Compensation Management, Operation Performance, Organizational Climate and Corporation Culture

Jiang Jing-Qing (2002) holds that compensation management can reflect corporation culture. Thus, rational compensation management can arouse good Organizational climate and influence staff behaviors which not only improve operation performance but also reduce corporation cost. Kopelman, Brief and Guzzo (1990) hold that corporation culture is compensation management during human resource management practice and individual understanding and feeling towards organization in order to influence operation performance. Robbins (2001) points out in the research that compensation management has close relation with Organizational climate and influences operation performance as well as forges corporation culture. Erdogan, Kraimer and Liden (2001) hold that if one organization has good Organizational climate and corporation culture where talents are free to display their ability, the operation performance is definitively improved.

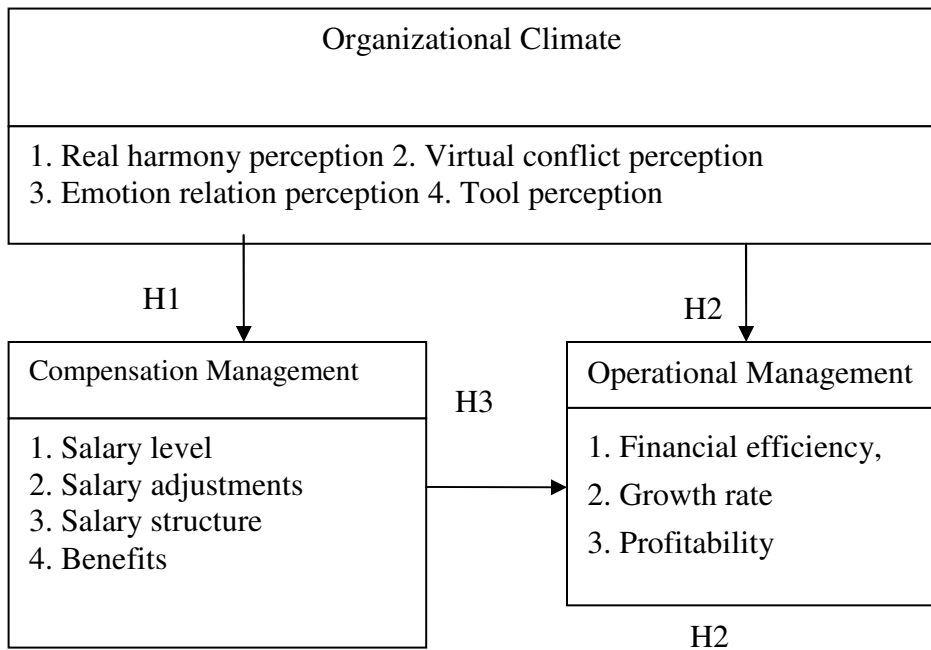
Methodology

Based on previous research background, aims and collected references, the essay establishes conceptual frame and puts forwards research hypothesis and makes use of questionnaires as the way to collect information and SPSS 14.0 statistical analysis to testify the

hypothesis. The research introduces in order research frame, research hypothesis, measurement among variables, sample characteristic analysis and data analysis way.

Research Frame

After the completion of above introduction and literature review, the study direction and related theories are clear and the fame of the essay is demonstrated below.



Research Hypothesis

The purpose of the research is to discuss the relationship among corporation culture, Organizational climate as well as its influence on compensation management and operation performance. Based on study aim and the conclusion from references discussion, comprehensive study of scholars and old-days research on compensation management, Organizational climate, operation performance as well as corporation culture, the essay put forwards research frame, as shown on Figure 3-1. Also, the following hypothesis on this theoretical frame is testified.

Hypothesis 1: Different Organizational climate has significant difference on compensation management

Hypothesis 2: Different Organizational climate has significant difference on operation performance

Hypothesis 3: There are significant differences among compensation management, operation performance and Organizational climate

3-1: compensation management has positive significant influence on operation performance.

3-2: Organizational climate has positive significant influence on operation performance.

Research on Measurement Among Variables

The research adopts questionnaires as study method. The content of questionnaires mainly based on the research variables of the research frame and the references of the related published researches of national and international scholars. The contents of the questionnaires are three parts such as compensation management, operation performance and Organizational climate are evaluated by Likert Six-point Scale, here is the clarification of related tables and figures.

Compensation Management

The design question entities of the research make reference on Heneman & Schwab (1979) point compensation management includes four dimensions, which are salary level, salary adjustments, salary structure and benefits. There are 23 question entities with totally agree, agree, partly agree, partly disagree, disagree and totally disagree on the scale. Each measurement method is Likert Six-point Scale.

Operation Performance

The question entities of the research make reference on Walker & Ruekert (1987) which is the most frequently used measurement for evaluation guidance of organization performance

and three dimensions of financial efficiency, growth rate, profitability. There are 19 question entities with totally agree, agree, partly agree, partly disagree, disagree and totally disagree on the scale. Each measurement method is Likert Six-point Scale.

Organizational Climate

The design of the questions is based on Xu Zhiwei (2002) who classifies Organizational climate into 4 dimensions including real harmony perception, virtual conflict perception, emotion relation perception and tool perception. Based on these 4 dimensions are used to compile Chinese Organizational climate research tables. There are 30 question entities with totally bad, very bad, bad, good, very good and totally good on the scale. Each measurement method is Likert Six-point Scale.

Sample Characteristic Analysis

Since established from 1957, Taiwan Fusing Industrial Co. has 52-year history. The main products of this biggest international door lock manufacturers, are commercial heavy-duty locks, residential light locks, door closers, electronic locks, transom closer and floor spring, fire locks, moulds manufacture, bathroom products. In 2005, it won the first two hundred Asian SMEs by *Forbes*. Facing competitions from the same industry, Taiwan Fu Hsing Industrial Co. is dedicated to high value products as Chinese marketing is advanced in low cost where low price competition of the peer is banished and low price is not the only pursuit of the market. As for door locks, it is mandatory to consider the high security of the products are quality guaranteed. Meanwhile, the outer design should match the overall decoration of the house in order to attract customers. Therefore, the competition advantage of Taiwan Fu Hsing Industrial Co relies not on mainland factories which are known for their low cost and its status cannot be replaced. It also has stable order on locks and door closers and successes in big American distributors and biggest

famous brand OEM. The research focuses on directors and staff of each department of Taiwan Fu Hsing Industrial Co by the method of questionnaire. Totally 300 pieces of questionnaires have been distributed. There are 224 pieces of responsive valid questionnaires with deduction of uncompleted questionnaires. The responsive rate is 70%. The research on the relationship between compensation management and its related organization atmosphere reflected by operation performance of Taiwan Fusing Industrial Co. provides empirical study for further research and offers reference for corporations.

Analysis and Results

Reliability and Efficiency Analysis

Efficiency Analysis

The research testifies the efficiency of constant tables on relationship among compensation management, Organizational climate and operation performance. The main contents of the test are to examine whether the dimensions of each factors covers the definition of the constants which are to be evaluated and the relevance among these same interrelated dimensions. The research makes usage of factor analysis to obtain factor structure matrixes of each entity. By factor extraction and the usage of axis factoring method, the common variance of variables is clarified. Then by shafting orthogonal axis, similar entities constitute one specific factor. The larger of factors load quantity value, the convergent efficiency is higher. In this research, the measurement tables show that all factors' loading quantities are higher than 50%. Therefore, it means that in construct efficiency, the convergent efficiency is rather significant.

Reliability Analysis

Reliability is the results of many-times test and measurement with consistency or stability. Or it is the value of estimated measurement errors and the index reflects the real

measurement degree. In Likert scale method, the frequently used reliability method is Cronbach α innovated by Cronbach (1951), a kind of measurement method which represents the inner consistency. The bigger α ' coefficient, the consistency is higher, which also represents the relevancy of question entities. The research is based on this method. As for Cronbach α coefficient of each variable, most of the values of each variable is bigger than 0.8 with the lowest reliability standards below 0.60. This means that question entities are based on the four dimensions and the inner consistency is rather high.

Results of the Analysis on Efficiency and Reliability of Compensation Management Scale.

After factor analysis, the compensation management scale extricates 4 factors. The reliability is represented by inner consistency coefficient Cronbach α . The first factor is salary level (characteristic value =9.931 , $\alpha=0.979$). The second factor is salary adjustments (characteristic value =4.445 , $\alpha=0.988$). The third one is salary structure (characteristic value=3.817 , $\alpha=0.963$). The fourth one is benefits (characteristic value=2.732 , $\alpha=0.966$). The shared accumulated explanation variance is 90.978%.

Results of the Analysis on Efficiency and Reliability of Organizational Climate Scale.

After factor analysis, the Organizational climate scale extricates 4 factors. The reliability is represented by inner consistency coefficient Cronbach α . The first factor is real harmony perception (characteristic value =10.978 , $\alpha=0.972$). The second factor is virtual conflict perception (characteristic value =10.003 , $\alpha=0.984$). The third one is emotion relation perception (characteristic value =9.306 , $\alpha=0.959$). The forth one is tool relation perception (characteristic value=3.766 , $\alpha=0.969$). The shared accumulated explanation variance is 81.079%.

Results of the Analysis on Efficiency and Reliability of Operation Performance Scale.

After factor analysis, the operation performance scale extricates 3 factors. In addition the

reliability is represented by inner consistency coefficient Cronbach' α .: the first factor is financial efficiency (characteristic value =7.073, α =0.931).The second factor is growth rate (characteristic value=5.179, α =0.929). The third one is profitability (characteristic value =3.068, α =0.926). The shared accumulated explanation variance is 80.631%.

Combined above analysis results, this scale obtains good support from both reliability and efficiency test. From three evaluation facets, i.e. compensation management, Organizational climate and operation performance, the accumulated variances of dimensions' factors are nearly 80% and the value of Cronbach α is higher than 0.90. This shows that the factors extricated in this table possess appropriate reliability. Besides, the four factors extricated in compensation management and Organizational climate, together with the three factors extricated from operation performance dimensions are consistent with the operation contents of the research which reflects good structure efficiency of factor structures.

Variance Analysis

Organizational Climate Variance Analysis

This part adopts quick clustering method to analyze Organizational climate dimension and the numbers of the classified groups are preset. Based on four groups proposed by Xu Zhiwei (2002), there are 4 classifications. K-MEANS is used to evaluate non-classified group and the results of group analysis are in line with Xu Zhiwei's classification (2002). By the usage of classification, Organizational climate is independent variable and compensation management and operation performance is dependent variable. By one-way analysis of variance, the groups whose average variances reach significant levels are determinate. Then by further use of multiple assays proposed by Duncan to testify data, the averages which are different from others are determinate so that the research on the hypothesis 1 which is the variances of different

Organizational climates towards compensation management and operation performance.

Initially, as the analysis results shown, on different Organizational climate, there are significant variances on the three factors which are salary level ($F=3.650$, $p<0.012$), salary structure ($F=1.526$, $p<0.020$), benefits ($F=2.946$, $p<0.043$) and so on of compensation management. It is known from the observation of average, in emotion relation perception, the average of the three factors are all high, followed by tool perception. The lowest are real harmony perception and virtual conflict perception. This means that in corporation environment, staff's feelings favor emotion relation perception. As a corporation offers the best working system, comparatively equal salary, benefit and organizes staff in the department and cross the department to communicate formally or informally, the staff is willing to communicate mutually and feel harmony by support and cooperation.

Then, among different Organizational climate, the two factors of growth rate ($F=14.546$, $p<0.000$) and profitability ($F=3.962$, $p<0.019$) of operation performance are with significant variance. As the average shown, in emotion perception relation level, these two factors' averages are rather high, followed by real harmony perception, tool relation perception and the virtual conflict perception is the lowest. This means that the more real harmony, emotional Organizational climate the staff perceives, the stronger the motivation to the growth of organization operation. As the more tool relation and virtual conflict the staff perceives, the more poor the performance of the staff towards the operation growth. This means that staff perceives direct harmony and the narrow relationship among groups and can grow emotion towards each other. For the purpose of group interest, each department can change their ideas and obtain the shared value to be loyal to the corporation and work whole-heartily to improve product quality which has influence on operation performance in return. The more sense of faction, the interest

relationship is closer and the groups' relationship is larger. Each department is devoted to its own affairs and lack communication with other departments which causes the divergences of ideas and the staff cannot cooperate well towards the operation goals and good operation performance.

Combined above analysis results of Organizational climate, it is shown that different Organizational climates have significant variance on the two factors of compensation management, which are salary level and benefits, and on the two factors of operation performance, which are growth rate and profitability. Thus, hypothesis 1 of the research which different atmospheres have significant variance on compensation management and operation performance is partly supported.

The Regression Analysis on Each Variable towards Operation Performance.

This part mainly focuses on salary level, salary adjustment, salary structure and benefits of compensation management. The real harmony perception, virtual conflict perception, emotion relation perception and tool relation perception of the Organizational climate are independent variables and the financial efficiency, growth rate and profitability of the operation performance are dependent variables. The regression analysis is used to testify the hypothesis of the research.

As the analysis results shown, salary level in compensation management and real harmony perception, emotion relation perception of Organizational climate have significant influence ($F=12.879$, $p<0.000$) on financial efficiency. This means that financial efficiency of operation performance is influenced by salary level of compensation management and real harmony perception and emotion relation perception of Organizational climate, which reflects the good and bad of the efficiency. Secondly, salary structure and benefits of compensation management and real harmony perception, virtual conflict perception of Organizational climate have significant influence ($F=11.893$, $p<0.000$) on the growth rate of operation performance.

Besides, salary, salary structure of compensation management and emotion relation perception, tool relation reception of Organizational climate have significant influence ($F=3.030$, $p<0.0005$) on profitability of operation performance. This means that there is relevance between the efficiency created by corporations and the influences of compensation management on profitability. Especially, the benefits and salary system satisfy the staff and motivate staff to stay and learn in the corporations. Staff is willing to communicate, to accept advice from the peers, to be self-improved, to be frank and cooperate with each other and put the group interest into priority place. This efficient, open, cultural and fun working environment offers money payment and retain like-minded and the most talented people.

Combined above the multiple regression analysis results of all these variables on the operating performance, it is shown that there has influence on the three factors of compensation management, which are salary level, salary adjustment, salary structure and benefits, and on the four factors of Organizational climates, which are real harmony perception, virtual conflict perception, emotion relation perception and tool relation perception, toward the three factors of the operation performance, which are financial efficiency, growth rate and profitability. Thus, hypothesis 3 of the research which there is significant difference on compensation management, operation performance Organizational climates and corporation culture is partly supported.

Conclusion and Suggestions

As for the management essences of these three factors, here is the conclusion of the research. After offering respectively advice and further suggestions are as followings.

Looking for Appropriate Corporation Culture to Improve Corporation

Operation Performance

In this changing environment, the improved corporation culture is helpful to advance

corporation's adaptability and to guide the development of the corporation which has huge influence on operation performance. The deeper understand on the force of corporation culture, the more natural one can set one's goal. Corporation culture may influence individual behaviors. Corporations should choose appropriate culture to select talents with shared values and grasp staffs' attitudes and behaviors. Apart from that, corporations should shift corporation goals and thoughts into belief and arouse staff's recognition and belongings. This future melts into organization's operation performance results. Only on the condition of excellent culture and win-win situation, the solid foundation can be forged.

*Highlights Corporations' Organizational Climate to Improve
Corporations' Operation Performance*

A corporation is like a big family. Staff is the important constitute members. To match up with corporations' operation belief, corporations offer staff the comfortable working environment and the distance between the supervisors and the grass roots is shortened. What's more, supervisors highlight the interpersonal relationship among staff and creates harmony Organizational climate where the relationship among staff is good to maintain the high morale and productivity. This can not only reduce operation cost, mobility and maintain harmony relationship, but also improve the corporation image and eliminate staff's suspect on organization environment. All the staff can adhere to corporation's operation belief, establish trusted group, work together towards the common goals, reflect on operation performance and the corporation grows and develops naturally even to lasting operation.

Offers Flexible Compensation Management to Improve Corporation Operation Performance

Human resource is great capital asset of the corporation. To retain talents, for departments, even individuals are different; compensation management value must be flexible enough in order to adapt to abnormal and exceptions. Avoid the situation where there is

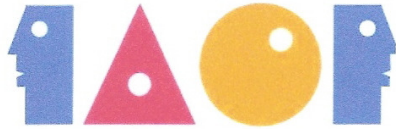
unpublicized salary and awards. Corporations should offer rational salary. As how to meet staff's practical needs, necessary communication and cooperation among supervisors and grass roots are needed. The transparent and public communication between supervisors and grass roots and corporation inner information, the respect and participation sense of staff have great influence on staff's motivation and behavior. The on-time grasp of staff's working attitude and behaviors, continuous study chance, growth environment and good human management system are the basic for application performance measurement index to realize corporation compensation management. Besides, corporations should establish object and justified performance appraisal system which punishment and the award are clarified so that staff's potential talents can be exploded and capacity can be forged.

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THE INTELLIGENT TIRE PRESSURE DETECTION/ADJUSTMENT
DEVICE/UNIT/SYSTEM

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Abstract

In this paper, we describe the Intellect tire pressure adjustment system that we designed is able to solve the problem which current single monitoring mode fails to deal with – the actual control of the pressure. The design of this system will provide four modes accordingly: 1.The sensor and adjustment of vehicle loading capacity (to coordinate with restarting after a stop or midway change of loading); 2.Low-speed (normal) running; 3.Bumpy road running; 4.High-speed running. When the vehicle is running, ECU will decide on the above modes and make an adjustment on the tire pressure for maximum safety.

Keywords: Tire Pressure Detection System ; ECU Microcomputer Control

Introduction

Since the development of automobile industry hundred years ago, we have witnessed the continuous improvements on its science and technology. These great developments include the comfort, manipulation, humanization, intellectualization, and computerization. The large variety of basic and optional equipments for automobile is even a feast for the eyes. However, safety-related inventions and equipments seem not sufficient. In view of this, I am devoted to a design that enhances safety in vehicles. At present, the monitoring of tire pressure is an important concern of the automobile industry. More and more vehicle manufacturers are including the tire pressure real time monitoring system as one of the basic equipments. The US government has even passed the law. This explains the importance of tire pressure monitoring. The system that I designed aims at this matter. The 2000 TREAD Act, which requires automakers to gradually provide tire pressure monitoring systems for vehicles sold in the US will correct this problem for new vehicles [1]. The TREAD Act will also reduce energy use because it demands that manufactures install a tire pressure monitoring system (TPMS) in future automobiles [2].

The German Umweltbundesamt reports a 30% reduction in a tire's rolling resistance can reduce a vehicle's fuel consumption from 2% to 6%, depending on driving conditions and other factors (Friedrich, 2002) [3]. The National Center for Statistics and Analysis of the USA (NCSA) conducted a comprehensive tire survey in February 2001 (Department of Transportation, Docket no. NHTSA2000-8572). A total of 11,530 vehicles were inspected at gas stations selected randomly throughout the USA. The survey indicated that 30% of the drivers of passenger cars check the pressure in their tires at least once a month, while about 7% do not check the pressure at all [4]. Under accelerating conditions, the tire/road noise represents the largest percentage of noise, after engine noise. Consequently, reduction of the tire/road noise is

very important issue【 5】.Both the under-inflation and over-inflation of tires will affect car safety. The existing tire pressure monitoring systems provided by vehicle manufacturers have a data discriminating function only. Though they help drivers understand the real time tire pressure data, they are not able to change the actual tire pressure instantly. In case of massive leakage of tire pressure when the vehicle is running with a high speed, or in case of under-inflation of tires which requires a pit stop during a long car journey, those systems will leave drivers in a helpless situation.

The Intellect Tire Pressure Adjustment System that I designed is able to solve the problem which current single monitoring mode fails to deal with – the actual control of the pressure.

The instant control of tire pressure is no doubt important, but it is also important to note that different running speeds, different road conditions and even different loading capacities (men, goods) require different tire pressures.

Therefore, the design of this system will provide four modes accordingly:

(a) The sensor and adjustment of vehicle loading capacity (to coordinate with restarting after a stop or midway change of loading);(b) Low-speed (normal) running;(c) Bumpy road running;(d) High-speed running.

When the vehicle is running, ECU will decide on the above modes and make an adjustment on the tire pressure for maximum safety. This case focuses on designing a full automatic system that has not only the monitoring function, but also the capability of adjustment control without additional power supply. It converts the existing kinetic energy and work together with ECU and other parts, accessories and the operation of a screw compressor to deal

with various road conditions and contingencies so that safety, convenience, energy saving and driving comfort can be achieved.

This system presses signal of transmission the induction by the microwave technology and the RFID technology as the embryo Presses the driving in embryo the data to inform immediately ECU Again pressurizes after the ECU distinction, the decompression, accumulation of pressure of organization and the barometric pressure part the constant voltage three kind of controls condition actuation design (solenoid valve and so on..) Beautiful t gathers Achieved its system does moves the goal to achieve in the driving the entire automatic monitor and the control.

Tire pressure increasing and decreasing can reach the suitable tire pressure for driving. It also can detect the load on the vehicle and make necessary tire pressure adjustment automatically, For driving on the rocky road, the tire pressure also can be adjusted automatically to meet the safety standard. (embryo presses standard value control) the basic four tires to press the standard control (to need to stop gasification)

Description Of System Design Mechanism

Construction Assembly

The drawing on the right is the assembly drawing of this design system (pneumatic components not included). At present, there are many types of transmission systems and suspension systems for vehicles on the market. Therefore, the construction of this design was also modified for the integration into different transmission systems and suspension system. Explanation on the Operation of Construction System When the vehicle is running, the turning force of the transmission shaft (Fig.2A.) is utilized to drive the timing pulley (design as shown in the construction of Fig. 2B). The electromagnetic clutch (design as shown in the construction of

Fig. 2B) actuates the screw compressor (Fig. .2B) to compress the air and store it in the pressure accumulator (Fig. 2C).The pressure limit of the accumulator must follow the control of the pneumatic device and ECU and give instructions to the electromagnetic clutch to stop the pressurization. The compressed air passes through the air outlet of the pressure accumulator and flows into the air inlet seat (Fig.2D), then into the transmission shaft (Fig.2A) and aluminum ring (Fig.2F), and finally gets into the tire for pressurization. In the meantime, the sensor inside the tire reports the pressure value to ECU. If the set point of the specific mode is satisfied, the construction will stop operation. It will restart operation when ECU determines another mode when the car is still running.

The Components of Supercharger (as shown Fig.3.)

This construction design integrates the timing pulley, timing belt, clutch, screw compressor into a single construction. Screw compressors, as shown in the diagram on the right, are common on the market. In view of this, the supercharger components of this design can be used together with a screw compressor.

Air Inlet Seats (as shown Fig.4.)

The air inlet seat, as shown in the diagram on the right, is fixed on the transmission shaft. The parts with hard chrome electroplates on the two sides should match the transmission shaft. The groove in between the electroplating must also stick to the air inlet groove to form a loop for air inlet. The oil filling hole is used for lubricating the bearings and isolating the air, while an oil seal should be installed on the other side.

Transmission Shaft (as shown Fig.5)

The diagram on the right is the display drawing of the front part of the transmission shaft. As shown in the diagram, the air inlet groove connects to the groove in between electroplates at the

air inlet seat to form a loop of air inlet. Air flows into air inlet A, as shown in the below sectional view, and enters the wheel rim (aluminum ring).

PS: The connecting point for air inlet groove and air inlet seat should be on the inside of the universal joint

Wheel Rim (Aluminum Ring) (as shown Fig.6.)

In the diagram, the air inlet A (in the middle of wheel ring) connects to the air outlet of the transmission shaft. The air flows from the air inlet B into the tire through the route as described in the sectional view.

Explanation of System Computer Mode (as shown Fig.7)

Normal Mode.

This mode emphasizes on examining the tire pressure instantly upon the start of the vehicle. Due to different loadings (the amount of passengers, goods or luggage etc), the weight of the vehicle changes and adjustments to the tire pressure must be made. Normally, for a 2.0cc medium sized car with 195/60-15 tires, a tire pressure of 2.2-2.4 (kg/cm²) for both the front and back wheels should be fine. But for cars that often carry many passengers or goods, the required pressure should be 0.1-0.2 above the normal value. Therefore, this mode can react to the above situations and make an adjustment according to the set standard values. The adjustment is completed once the vehicle is running. The tire pressure measured in this mode after the adjustment will become the new memorized value. The other three modes will make judgments based on this memorized value until a new memory is generated by a change of loading. In such case it will abandon the old memory and use the new memory.

Low-Speed Mode (as shown Fig.8)

The set speed of this mode is 0~80(km/h). When the speed is between 0 and 80, the tire pressure is the memorized value as examined by Mode 1 (Normal Mode). This tire pressure is also the safest value according to the current condition. If the condition does not satisfy the requirements for High-Speed Mode or Bumpy Mode, the tire pressure of this mode will be maintained.

Bumpy Mode (as shown Fig.9)

If the vehicle is running on a bumpy road with a speed within the range of the Low-Speed Mode, the sensor will transmit the message to ECU. Meanwhile, the tire pressure will be adjusted accordingly. When the vehicle has passed the bumpy road, the tire pressure will resume to that of the Low-Speed Mode. Normally speaking (excluding other factors), when the normal tire pressure is 28~30 pounds, 30 pounds will be generally used. In a poor road condition where the traction of the road surface is not good, the tire pressure will be adjusted to 28 pounds to give a better traction, in order to extend tire life and maintain road safety. When the irregular area of thrust surface enlarges SO to have the reduced pressure to whip safe (pressure of this pressure and the low speed travel not equally coordinates empirical datum standard value) (below hypothesis speed 40km and bumper sub to induce time frequency value enhancement)

High-Speed Mode (as shown Fig.10)

The set speed for this mode is 80 km/h and above. When the driving speed exceeds 80km/h, it satisfies the condition for the High-Speed mode and the tire pressure will be adjusted instantly. Normally speaking (excluding other factors), when the normal tire pressure is 28~30 pounds, 30 pounds will be generally used. In case of running on a super highway, the tire pressure can be adjusted to 32 pounds to avoid refraction of tire walls that may cause tire

puncture. However, to avoid the adverse effect, the tires should not be over-inflated. We all know that the pressure inside the tires will increase when the weather becomes hot. So, the weather factor is also considered in the ECU judgment. In the extremely hot summertime, the tire pressure should also be increased appropriately in order to help the tires cool down. (Due to global warming, this will (the extremely hot summer OR high speed travel to pressurize in order to radiates) gradually the few tires and the ground contact are become a major concern in the future.)

Conclusions

If the tire pressure is insufficient, do not drive the vehicle or leave the vehicle in parking for a long period. The problem should be dealt with immediately because this will cause damage and deformation to the tire walls and tire surface. Above all, such damage and deformation are sometimes not easy to be observed by naked eyes, but will create a serious crisis to road safety potentially. Even more, if the problem happens to one of the tires or one side of the vehicle, the balance of manipulation will be lost. Even if a slight insufficiency of tire pressure can at least cause an increase abrasion to the tires. This design system will solve the above problem.

An over-inflation of tires will decrease the ground contact area and cause rough performance, tire deformation and difficult tire tracking. Furthermore, the abrasion at the center of the tire will be larger than that at the two sides, which is an abnormal condition. Therefore, frequent inspection of your tires should be carried out even if the car runs on ordinary roads. This design system will solve the above problem.

An under-inflation of tires will make turning difficult, meaning that the steering wheel will become very heavy. The engine requires more power to drive the tires. Therefore, insufficient tire pressure will cause fuel consumption because the ground contact area for the

tires becomes larger. In addition, insufficient tire pressure will accelerate the aging of tires. When the tire pressure is insufficient, the two sides of the tire surface will be worn. This will create a potential danger as the tires could be punctured when the vehicle is running with a high speed. For these reasons, a proper maintenance on tire pressure ensures road safety. This design system will solve the above problem.

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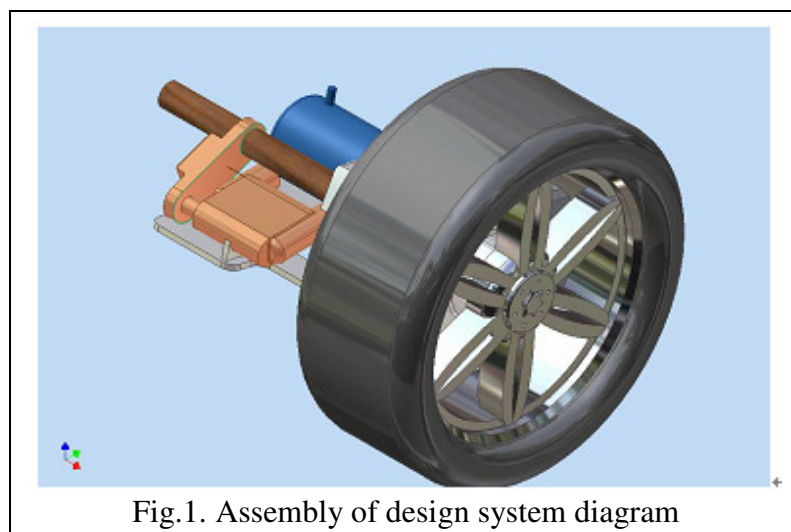
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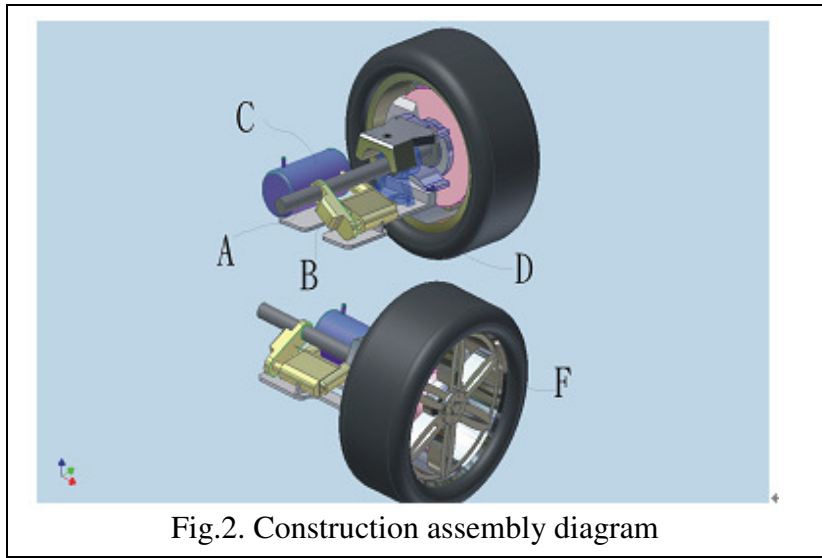


Fig.2. Construction assembly diagram

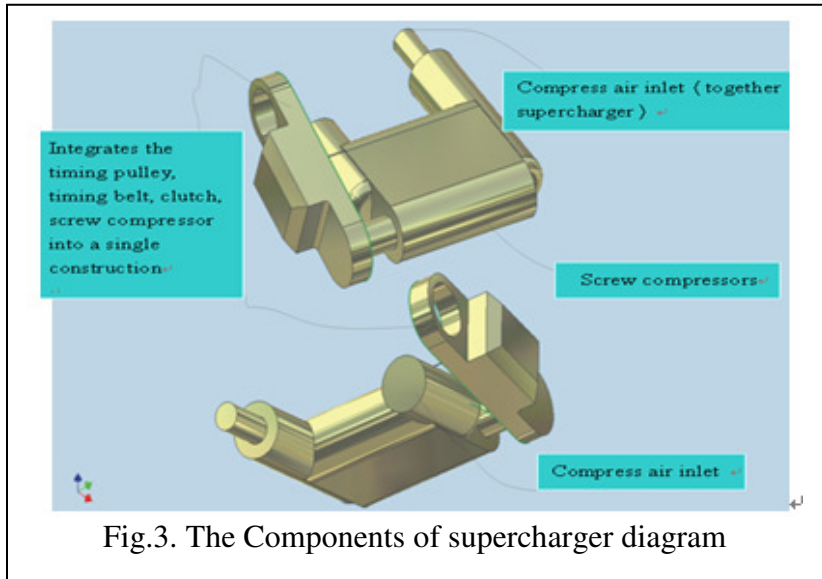


Fig.3. The Components of supercharger diagram

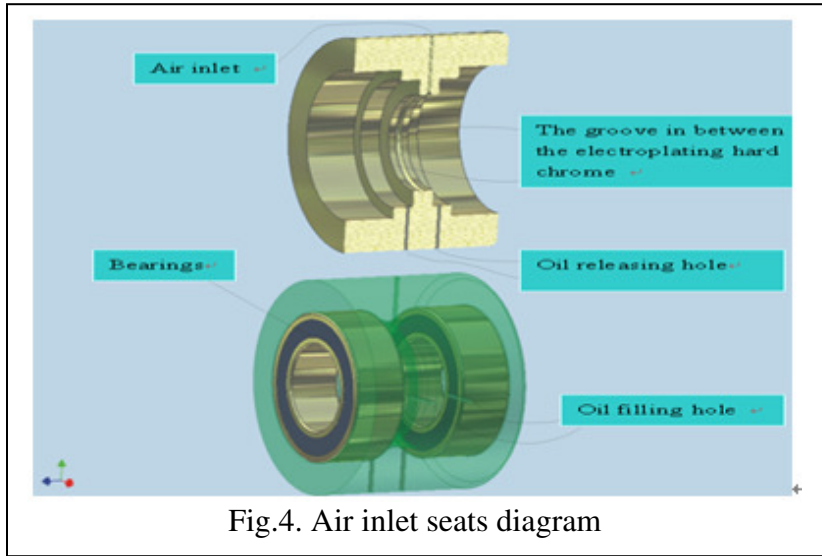
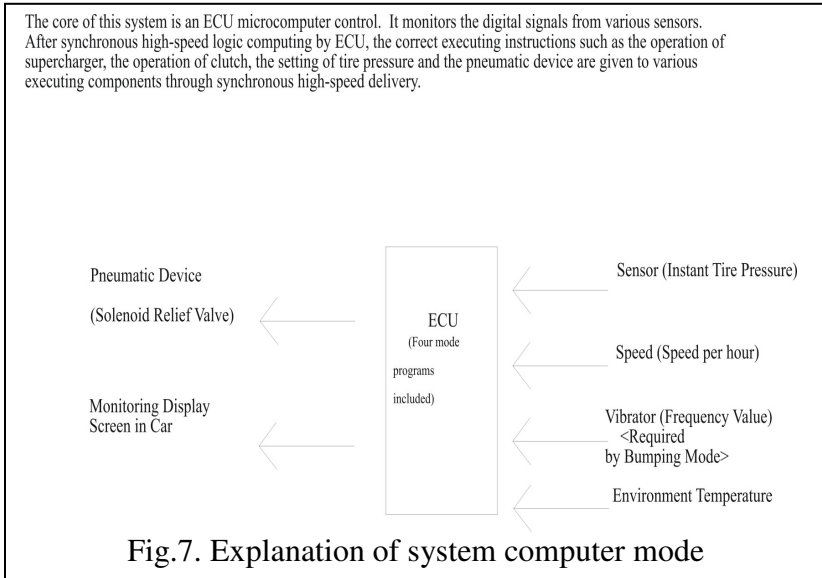
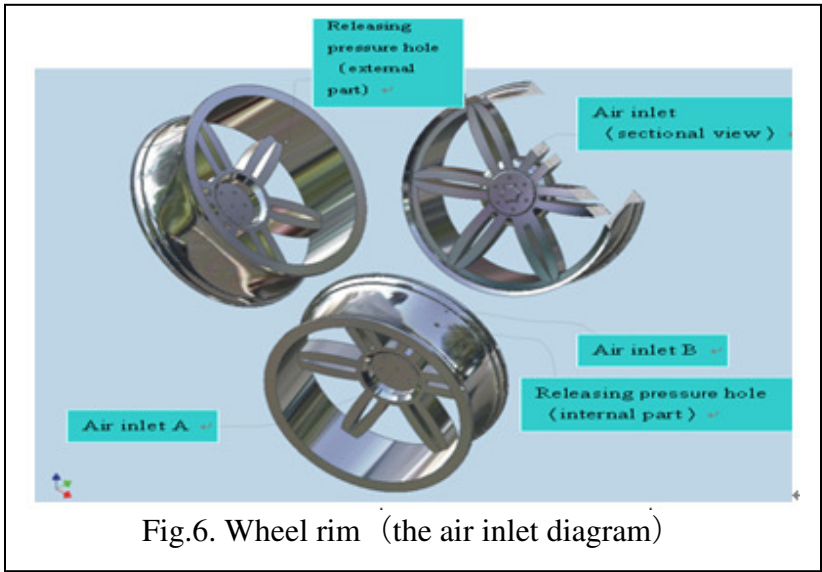
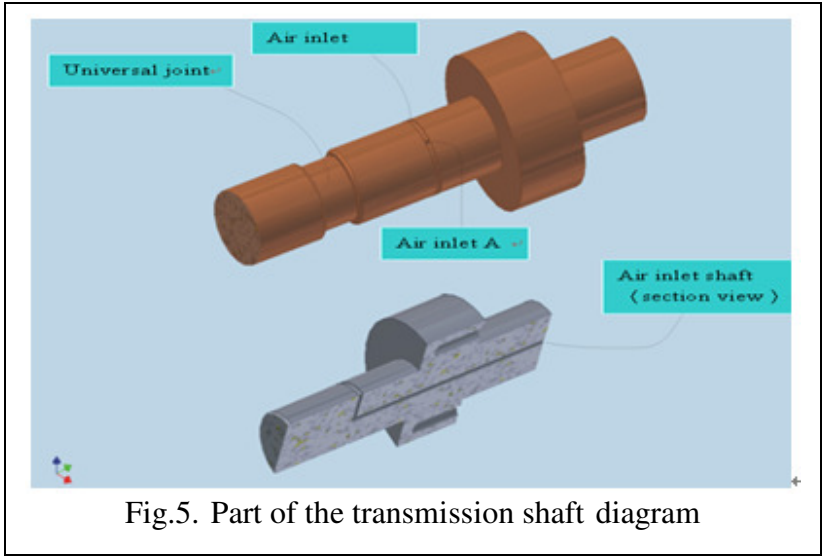


Fig.4. Air inlet seats diagram





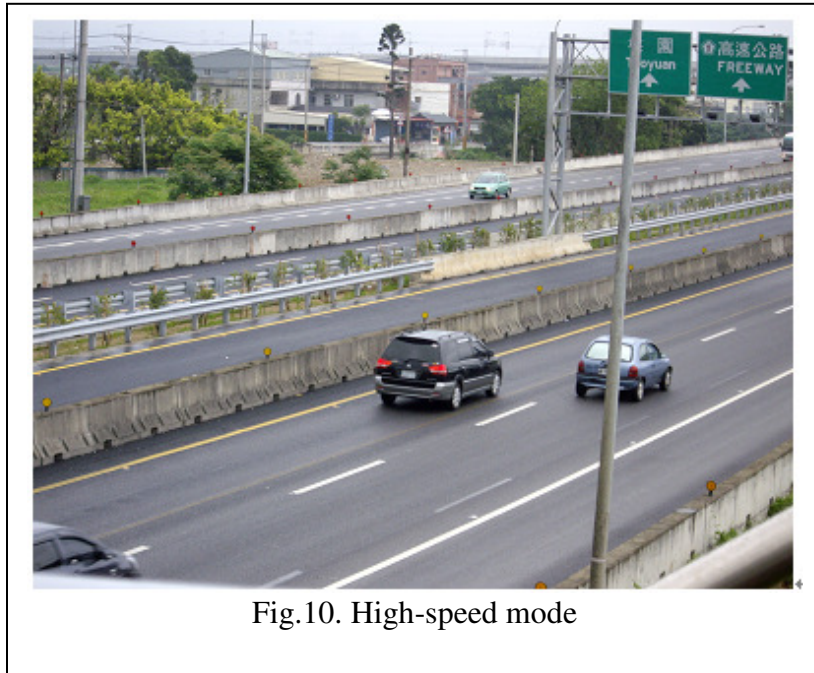


Fig.10. High-speed mode

THERMO-SOLUTAL NATURAL CONVECTION IN ENCLOSURES WITH HORIZONTAL
DOUBLE APERTURE RATIO

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Abstract

This study attempts to explore the status of reflow oven under various boundary conditions and heat offering by means of performing experiment and numerical methods to simulate the phenomenon of thermo-solutal natural convection in a horizontal double-opening divided square box, so as to analyze the effects of horizontal divided square box under different temperatures. The fixed buoyancy ratio (N value), the flow field displayed due to the arrangement of plate, the temperature of the liquid inside the box and the varieties of concentration are included as the objectives of this study. A square box made of copper and acrylic sheets with an aspect ratio of 0.5 is used as the experimental apparatus of this study; the horizontal divided plates are placed in the upper and bottom of the interior of the box, while the fluid inside the box will be given in different concentrations. A measuring analysis will be performed to examine the temperature, concentration and mass transmission rate of the current. Finally, the FLUENT (CFD software) will be adopted to conduct numerical simulation on prototype to demonstrate an experiment with temperature variation rate and analyze the errors as contained. To simplify the governing equation of flow field, the overall coordinate system will be treated as 2D numerical simulation, while visualization will be used to discuss and analyze the physics and results as developed with an attempt to improve the design of reflow oven. The dimensionless parameters as discussed in this study include:

$Ar=0.5$, $Ap=0.33$, $Pr=7\sim 8$, $Sc=1700\sim 2500$, $N=7.53$, $Gr_t=8.16\times 10^5$, $Gr_m=6.15\times 10^6$

Keywords: Heat-insulated plate, natural convection, doubled-opening ratio.

Introduction

Germanium (Ge) and Silicon (Si) are the most common element semiconductors used for making transistors; some properties contained within have been approved during the evolution process of these two elements. However, researchers found that compound semiconductors such as GaAs, GaAsP, InP, AgAlAs, InGaP, featuring particular properties, can be adopted as semiconductor materials as well. (Jiang et al., 2002) used GaAs to examine the thickness distribution of epitaxial film in every possible parameter conditions. (Fotiadis et al., 1990) focused on MOVPE in vertical reactor to examine the transmission status under different parameter conditions; while (Diawarie et al., 1990) released a detail statement describing the operating conditions (size, temperature, etc) for a MOCVD reflow oven and the thickness of the film as developed eventually.

The occurrence of natural convection in a closed chamber can be classified into two types according to the direction of the change of its density gradient: 1. A change of density in a direction vertical to the gravity direction; 2. An increase of density gradient in a direction in parallel with the gravity direction; in this case, the movement of liquid will not start until the density gradient reaches to a certain level. The two modes may occur at the same time and make things more complicated. (Brown and Solvason, 1962) once performed an experiment to study the development of “thermo-solutal” natural convection of by placing a divided plate with tiny openings on which between two chambers. (Nansteel and Greif, 1981, 1984) found that the placement of divided plate in a closed chamber may generate recirculation zone and thus reduce the effect of heat transfer. (Bejan et al., 1983) used water as working fluid to conduct an experiment exploring the development of natural convection in a closed chamber with divided plate, while the result indicated that the opening ratio played an important role in heat

transferring and the development of flow field. (Winters,1982) emphasized on the numerical analysis of Rayleigh ($10^6 \sim 10^{11}$), he found that when the number of Rayleigh is low, the distribution of fluid will occur on the back of the divided plate, while high Rayleigh will have its fluid distribution develop on the front of the divided plate.

Chou (1990) used divided plates with and without openings to examine the phenomenon of natural convection; the result as gained showed that the heat transferring rate for plate with openings is higher than which of the plate without openings by 14%~30%, while the size of divided plate did not have obvious influences on the distribution of temperature field and speed field in the lower section. (D.A. Olson, 1990) conducted a series of studies investigating the occurrence of natural convection in a closed chamber with and without divided plates, and made comparison on the speed field and temperature field as generated in different locations. The results showed that the heat transferring rate in a closed chamber with divided plates is lower than the one without divided plates by 10%~15%; besides, the divided plate will improve the secondary flow as generated nearby the plate itself. (E. Zimmerman ,1986) found the intensity of the main flow between the upper and bottom divided plates within a closed box will decrease as the heat transfer of the divided plate increases, and Nu will decrease as there is a divided plate and the heat transfer of the divided plate increases. Wang (2002) study of thermo-solutal convection in rectangular enclosure with partitions is presented in article. An electrochemical method based on a diffusion-controlled electrode reaction was employed to create the concentration gradient and used shadowgraph recording technique to visualize and analyzed the flow field phenomenon. The afore-mentioned studies were based on numerical simulation or using air as the experiment medium, and most of the experiments were performed under the absolute heat-transfer condition. The heat loss due to heat transfer system and experimental

errors as a result of heat transferring were unavoidable; besides, it is impossible to obtain high Ra and Pr in a common heat-transfer experiment. However, the experimental errors due to heat loss may be avoidable in an absolute mass transfer system.

Following the advances of semiconductor technology, the IC chips have been widely applied in man's daily commodities. However, the current standing of semiconductor industry in Taiwan still remains in the phase of manufacturing development, which means it is a pure manufacture business. As a result, the researching, developing and manufacturing of the semiconductor facilities shall be the key matters that keep the industry competitive in a long term. In view of this, this study adopts the MOCVD of reflow oven with horizontal double-opened plate as the study target to function as references for semiconductor business in the manufacturing of reflow facilities and production process as well, so as to increase the productivities while lower the production cost.

Experimental Method

The temperature gradient of the boundary condition and the square box with an aspect ratio (Ar) of 1.8 as adopted in this study is set up based on the circulator, while the adopting of electro-chemical system is based on the theory of limit current value as stated by Tobias et al, (1953) to generate mass transferring inside the system. The size and circuit diagram are disclosed in Fig 1. The shadowgraph is adopted to observe the flow filed.

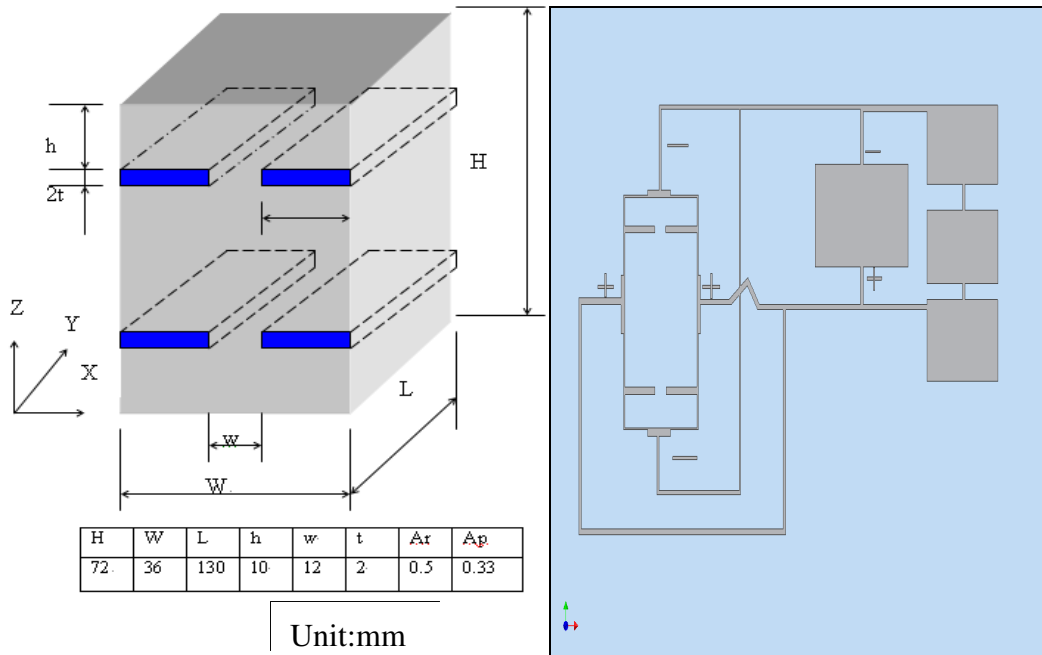


Figure 1. Illustration of Test Cell and Electric Circuit

Results and Discussion

The Observation Of Thermo-solutal Flow Field

The forward experiment of the upper and bottom divided plates. The top and bottom plates are heat plates; the plates placed on the right and left are cool plates. The copper sulfate as adopted is 0.069M, $Gr_t = 8.16 \times 10^5$; $Gr_m = 6.15 \times 10^6$.

When the pure temperature gradient reaches the heat stable status, the high temperature fluid as occurred from the temperature boundary layer around the top heat plate will pile up on the top plate and in the area around the upper double-divided plates. Whereas the high temperature fluid developed around the bottom plate (heat plate) will rise up along the bottom of the right, left plates inside the bottom double-divided plates as it departs from the temperature boundary layer. As influenced by the low-temperature fluid generated around the right and left cool plates, the flow direction of the main heat flow will be changed as a result (the high-density fluid generated by the cool plate effect will be separated from the cool plate and move toward the

bottom divided plate as it is driven by the gravity force after departing from the temperature boundary layer) and move toward the right hand side of the bottom double-divided plate and form a fluid circulation with the uprising fluid within the bottom divided plate, and thus a regional “fluid trap” effect will be developed in the area surrounded by the right, left plates (cool plates) and the upper, bottom plates, whereas two separate flow circulations will also be formed in the space between the bottom plate and bottom divided plate, and the space between the upper plate and the bottom divided plate as well. The heat flow generated from the center of the bottom plate will rise up after departing from the temperature boundary layer and go through the center of the upper and bottom divided plates and reach to the top plate; see Fig.2(a). When extending the time to 40 minutes, the circulation fluid formed between the upper, bottom divided plates and the right, left plates will move toward the right, left plates, while the less heavier fluid will rise up along the cool plate to the top across the center between the upper divided plate and the two divided plates, and mix with the main flow as generated by the heat flow generated from the center of the bottom plate. See Fig. 2(b). While the mass transfer is added with the top and bottom plates being the heat plates (Negative pole) and the right and left plates being the cool plates (positive pole), and the copper sulfate is 0.069M, $Gr_t=8.16 \times 10^5$; $Gr_m = 6.15 \times 10^6$, $N=7.53$, the bigger the absolute value of N is, the greater the influence of the density effect will be. The high-density fluid generated from the right and left plates will move toward the bottom double-divided plates after departing from the temperature boundary layer, the movement is slower in the higher area yet it is more obvious in the lower area, while a low-temperature high-density fluid will be piled up in a space between the cool plate and the divided plates consequently. The light-heat fluid generated by the bottom heat plate (negative pole) will rise up after departing from the temperature boundary layer, while the heat fluid from both sides will

move toward the center of the two divided plates along the down side of the bottom double-divided plates as it is blocked by the bottom double-divided plates. At the same time, the light-heat fluid as generated from the center of the bottom plate will rise up along the center of the double-divided plates and mix up with the fluid as formed along the two sides of the bottom divided plate and keep on going up. Since the high-density fluid generated from the right and left cool plates between the upper and bottom plates will run into the uprising heat flow produced by the double-divided plates in the bottom, the lower fluid will push up the downwards upper fluid while integrating with the right and left cool plates and thus developing into a large circulation system. See Fig.2(c). The heavier heat fluid as generated from the upper double-divided plates does not descent significantly due to its being pushed up by the uprising fluid in the bottom, and thus a separate small circulation system on both side s is formed as a result.

When the high-density fluid generated by the right and left cool plates below the upper divided plates moves toward the center, it is also influenced by the rising heat flow from the top and the bottom, yet the temperature effect is not strong enough to push up all the high-density fluid, some of which will go down and form a circulation between the cool plates and the upper and bottom divided plates. As time goes by, the circulation movement becomes more evident and the high-density fluid existed between the double-divided plate and the heat plate will continue to develop in the circulating manner. See Fig. 2(d). The main flow in the flow field is disclosed in Fig.2 (f).

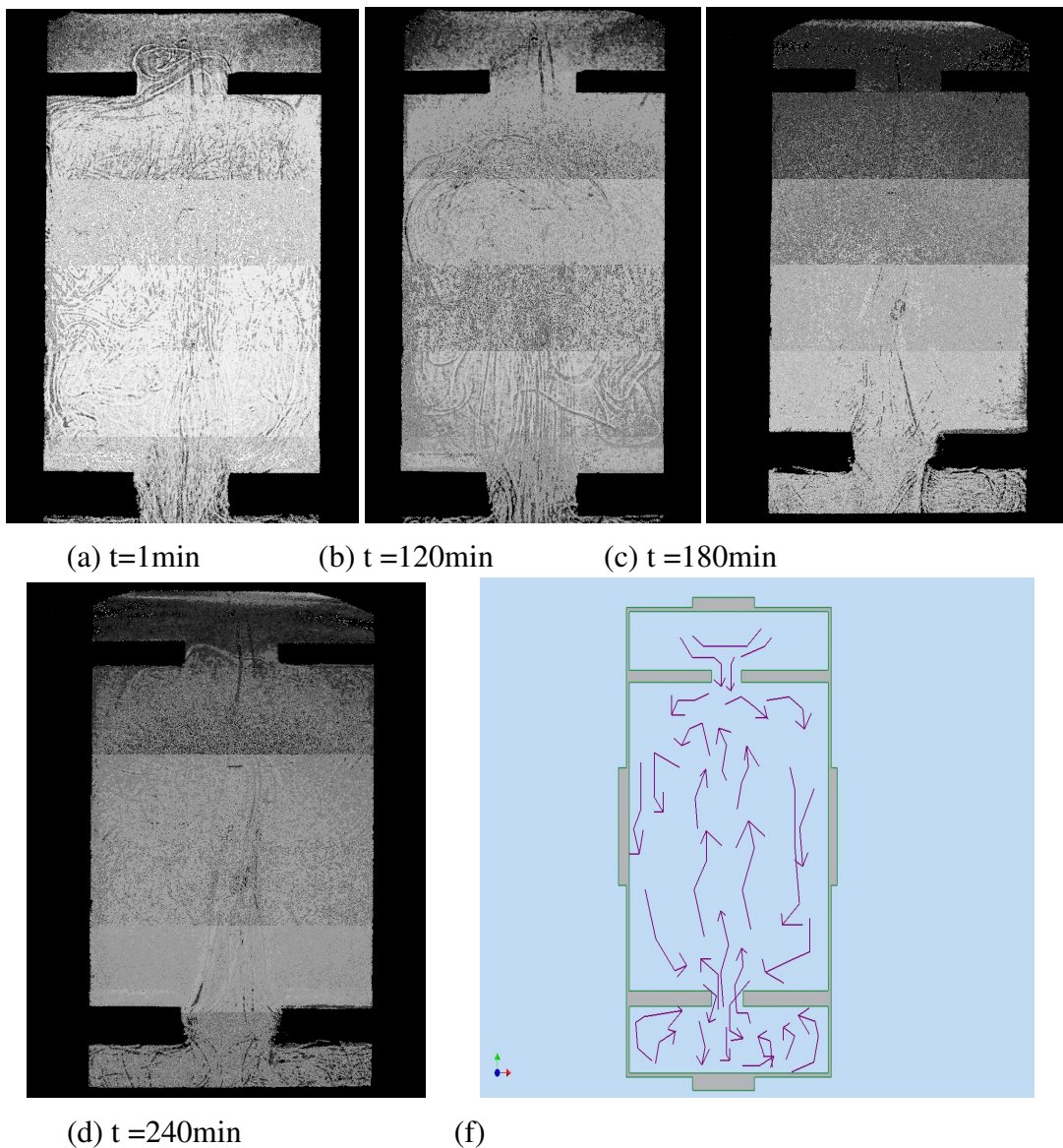


Figure 2. Flow pattern in aiding case for $At=0.5$, $Ap=0.33$, $Gr_t=8.16 \times 10^5$, $Gr_m=6.19 \times 10^6$

The Temperature Distribution of Forward Flow Field of The Upper and Bottom Double-Divided Plates

A 2D positioner is used to fix the T type thermocouple, while the T type thermocouple is putting inside the flow field to measure the temperature at $x/W = \bar{x} = 0.3, 0.5, 0.8$; $y/L = \bar{y} = 0.5$. The copper sulfate is 0.069M; $Gr_t = 8.16 \times 10^5$; $Gr_m = 6.15 \times 10^6$.

The top and bottom plates are heat plates (negative pole), with the right and left plates being the cool plates (positive pole). When the pure temperature gradient reaches the heat stable status, the high temperature fluid as occurred from the temperature boundary layer around the top heat plate will pile up on the top plate and the area around the upper double-divided plates. As seen in the temperature distribution diagram, the dimensionless temperature at the point of $\bar{x}=0.3, 0.5, 0.8$ shows a linear rising state. See Fig. 3.

When the mass transfer is added, the low-temperature high-density fluid will pile up in the area between the divided plate and the cool plate, making the movement of the fluid in this area more slow. The heat transfer in this area is driven by transmission effect and thus the temperature of the whole area, along with the pure temperature field, is similar to the temperature of the cool plate. When observing the temperature distribution between the upper and bottom divided plates at the point of $\bar{x}=0.3, \bar{x}=0.8$ and $\bar{x}=0.5$, we found that when $\bar{x}=0.5$ and $t=0$ min, the dimensionless temperature will rise up to about $t=240$ min is 0.49; and at the point of $\bar{x}=0.3$ and $\bar{x}=0.8$, the dimensionless temperature will be evenly distributed at 0.45 or 0.7.

Analysis on Mass Transfer Rate

The value of Gr_m is fixed to examine the relation of Sh , the Sh is higher in forward flow filed than in backward flow field. The result can be seen in Fig. 4. The main reason is that when the heat and mass exist in a forward field, the temperature differences between the two plates will increase, thus making the rising of the temperature of the fluid while changing the overall convection effect of the fluid. When the mass transfer is added, it will promote the movement of mass transferring and affect the mass transfer rate, and thus the Sh will be determined according to the structure of flow field and the amount of limit current.

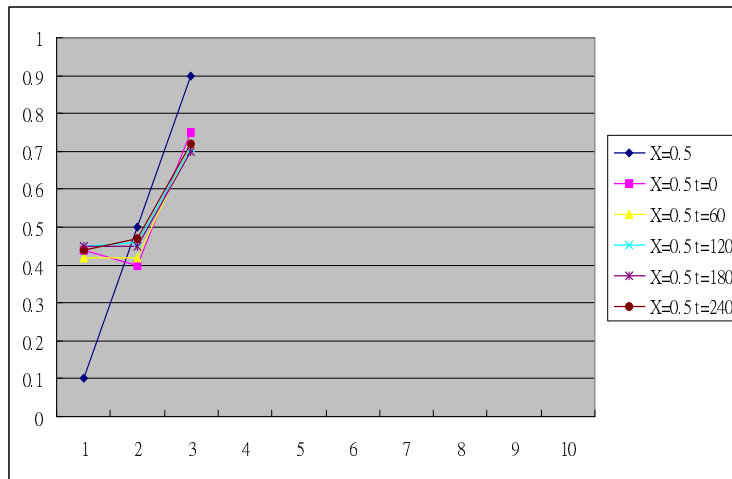


Figure 3. Temperature Distribution in Aiding Case for $Ar=0.5$, $Ap= 0.33$, $Gr_t=8.16 \times 10^5$, $Gr_m=6.19 \times 10^6$

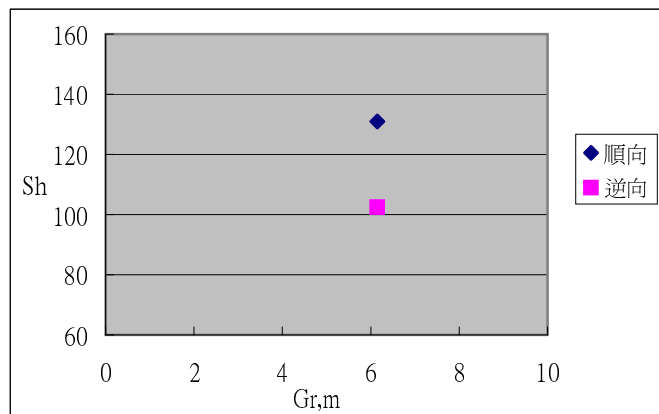


Figure 4. Correlation of Sh with $Gr_m (\times 10^5)$ ($Gr_t=8.16 \times 10^5$)

Numerical Analysis

Simulation as seen will be conducted with the top and bottom plates being the heat plates and the right and left plates being the cool plates, following a grid of 2557 nodes. As learned from the result, the fluid existed in the top plate will pile up as a result of affecting by the opening ratio of the double-divided plates (upside), while the fluid generated from the bottom

plate will develop a heat accumulation inside the double-divided plate under the influences of the cool and heavy fluid as generated from both sides; however, some heavy and heat fluid and light and heat fluid will go through the doubled-divided plates (downside) and enter into the flow field of the cool plate with their temperature rising up. See Fig. 5. As the heavy and heat fluid and the light and heat fluid flow into the cool field, a maximum velocity of 3.0×10^3 (m/s) will be measured at the point of $x=0.022$ (m), $y=0.2$ (m) in the double-divided plate (downside); see Fig. 6. However, the eddy current will develop in the cool field as a result of the dropping of the heavy and heat fluid (see Fig. 7), an eddy current rotating counter clockwise will form on the right side of the doubled-divided plate (downside) while another clockwise current will develop on the left side of the doubled-divided plate(downside).

Conclusions

The Type of Flow Field

A closed-type square box containing the upper and the bottom doubled-divided plates, a heat accumulation is formed on both sides of the inner part of the upper divided plate during the experiment. After the mass transfer is added, the occurrence of the accumulation of the boundary layer of high-density or low-density mass and the resolution of density surface can still be anticipated.

The Distribution of Temperature

When the pure temperature gradient maintains at a stable condition, the

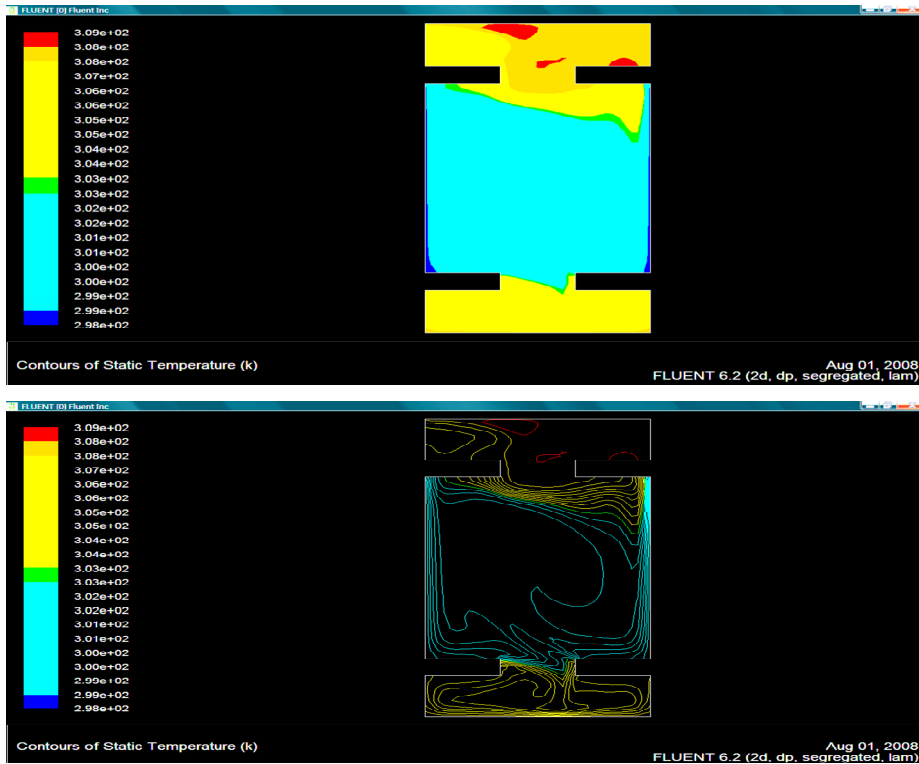


Figure 5. Temperatures distribution Hot (left) side 308K
Cold (right) side 298K

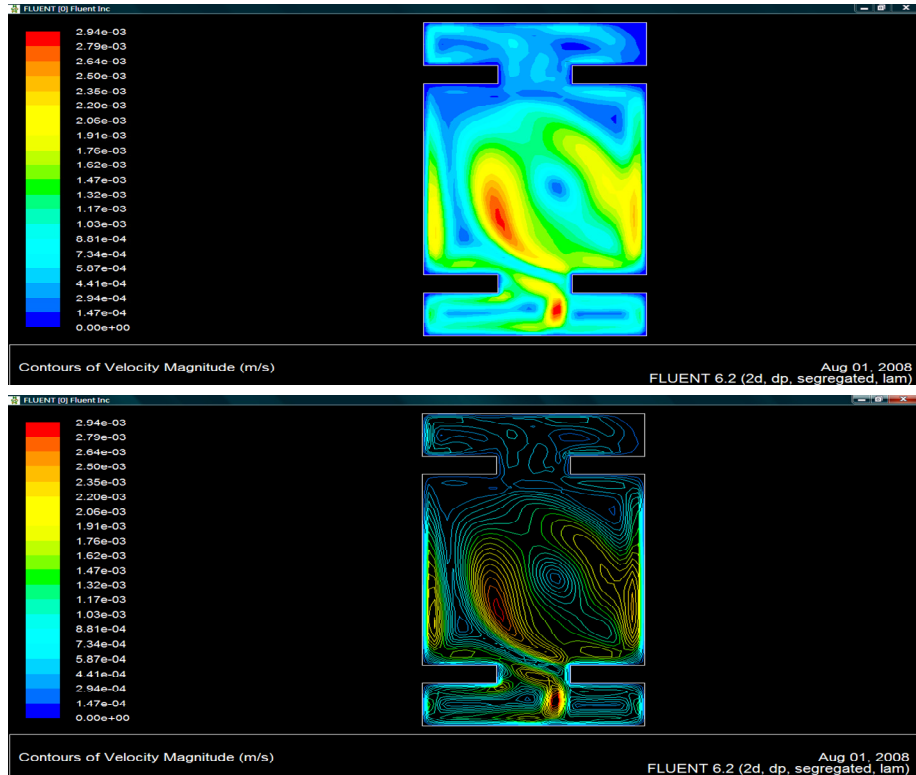


Figure 6. Velocity distribution Hot (left) side 308K
Cold (right) side 298K

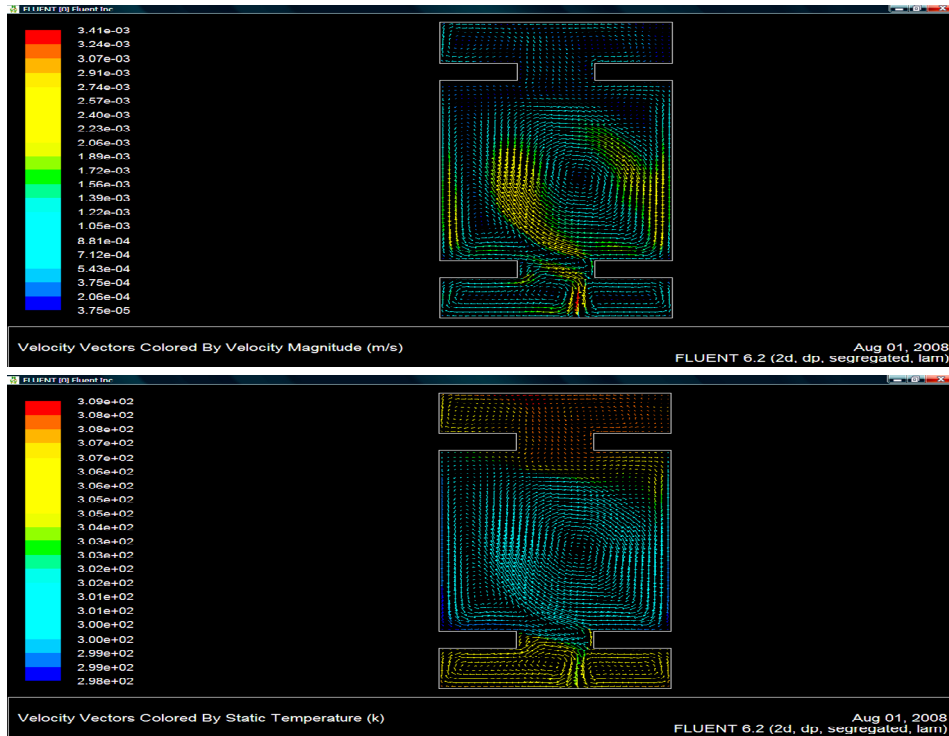


Figure 7. Vector distribution Hot (left) side 308K
Cold (right) side 298K

temperature between the upper and bottom divided plates will rise up in a linear manner. After the mass transfer is added, the dimensionless temperature at $\bar{x}=0.3$ appears to be higher in the forward filed than in the backward filed (+0.1).

The Distribution of Density

In a thermal-solutal forward experiment, the density of fluid existed between the upper and bottom divided plates and the top and bottom plates is high, while which in the center of the flow filed is more stable and close to the substance itself.

Nomenclature

A_p	opening ratio $(H - h) / H$
Ar	aspect ratio (H/W)
D	expansion of coefficient (cm^2/sec)
Gr, t	temperature of Grashof number $(g\beta \square TH^3/v^2)$
Gr, m	concentration of Grashof Number $(g\bar{\beta} \square C H^3/v^2)$

H	height of enclosure (cm)
K_m	mass transfer coefficient
L	length of enclosure (cm)
Le	Lewis Number ($Sc/Pr=\alpha/D$)
N	buoyancy ratio ($\bar{\beta} \Delta C/\beta \square T$)
Pr	Prandtl Number (ν/α)
Sc	Schmidt Number (ν/D)
Sh	Sherwood Number ($K_m \times H/D$)
T_h	hot temperature ($^{\circ}C$)
T_c	cold temperature ($^{\circ}C$)
W	enclosures width (cm)
g	acceleration due to gravity (cm/sec^2)
h	partition to the enclosure distance (cm)
t	partition thickness(cm)
x, y, z	dimension coordinates
$\bar{x}, \bar{y}, \bar{z}$	dimensionless coordinates

Greek Symbols

α	thermal diffusivity (cm^2/sec)
β	coefficient of thermal expansion of fluid ($-\left(\frac{1}{\rho}\right)\left(\frac{\partial \rho}{\partial T}\right)_c$)
$\bar{\beta}$	coefficient of concentration expansion of fluid ($\left(\frac{1}{\rho}\right)\left(\frac{\partial \rho}{\partial C}\right)_T$)
ν	kinematic viscosity (cm^2/sec)

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A CONCEPTUAL MODEL FOR ASSESSING THE IMPACTS OF GENDER ISSUES ON TECHNOLOGY EDUCATION

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Abstract

Based on Davis' Technology Acceptance Model, the research proposed a new model includes variables such as social-economic class, gender role, gender equality, and self-image. The results indicate that there were significant differences ($p = .004$) exist in gender role based on different college year of female students. The younger female students tend to have less traditional gender role stereotype than elder female students. However, no significant differences exist in gender role, gender equality, and self-image based on female student parents' social-economic status.

Keywords: TAM, gender role, gender equality, self image

Introduction

In educational setting, Information technology (IT) has begun gradually to play an indispensable role. Applying IT in instruction can change education significantly. The adoption of IT can also improve students' learning, problem solving and creativity. Women continue to be significantly less receptive to the IT than men. Studies in the US and Asia continue to show that education in IT has yet to promote a concept of a better society that many women will advocate. It is generally agreed that understand the gender differences on the acceptance of Information technology will help instructors in improving the overall quality of teaching efficiency. To

understand the interrelationships with those gender related variables will be helpful in explaining why female students have higher or lower technology acceptance.

Literature Review

Users' acceptance of Information Technology (IT) is a precondition before users can recognize IT's value and then utilize it. As early as mid-1980s, many models or theories tried to explain users' technology acceptance have been proposed and widely discussed. The most important ones were the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), the extended technology acceptance model (TAM2) and the most recent Unified Theory of Acceptance and Use of Technology (UTAUT)

Theories like TAM, TPB and UTAUT were all originated from TRA, which explain human behavior from social psychology's view point. TRA was very general in nature and tried to explain almost any human behavior. TRA suggests that social behavior is motivated by an individual's attitude toward carrying out that behavior. An individual's actual behavior can be predicted by behavior intention, which is determined by both the attitude towards a specific behavior and subjective norm concerning the behavior in question. In other words, behavior is the result of one's beliefs about the outcomes of performing that behavior after evaluating each of those outcomes.

TAM (Figure 1) adopts TRA's causal linkages, a sequence of beliefs, attitudes, intentions, and behaviors, to explain the individual's IT acceptance behaviors. In TAM, perceived usefulness (PU) and perceived ease of use (PEOU) were hypothesized as fundamental determinants of user acceptance of a given IT. Davis (1989) defined perceived usefulness as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (p.985) and perceived ease of use as

“the degree to which the prospective user expects the target system to be free of effort” (p. 985). PU and PEOU have a direct influence on an individual’s attitudes toward the use of IT. An Individual’s attitude impacts one’s behavioral intentions to use IT. Behavioral intentions, in turn, directly affect actual IT usage.

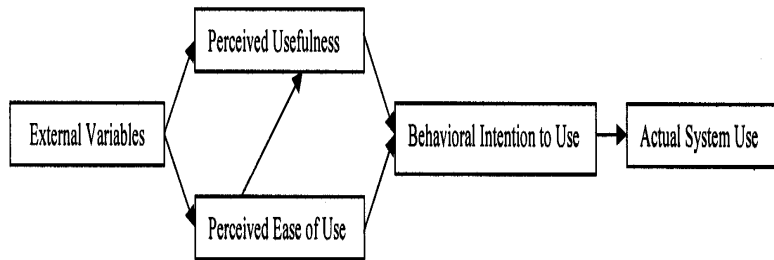


Figure 1. Technology Acceptance Model (TAM)

Research Methodology

Population and Sample

The target population contained all postsecondary students who were enrolled technical universities in Taiwan during the spring semester of 2009. Cluster sampling was used to select students in the study. Samples were collected from 4 technical universities located in northern, middle, and southern Taiwan. In total, there were 35 classes of students who were over 18 years old and from different academic majors, such as Management Information Systems, Healthcare Administration, Hospitality Management, and Sports, Health, and Leisure participated in this study.

The Survey Instrument

An initial survey instrument with 43 questions was developed. Questions 1-5 collect the demographic data of the students and social-economic status of their parents. Five point Likert scale was used in Questions 6-43. Variables such as gender role, gender equality, self image, perceived ease of use, perceived usefulness, students’ actual use of computers and network were

measured in these questions.

Instrument Validity and Reliability

One hundred and ninety two students participated in a pilot study. Principal component analysis was applied to assure the reliability and validity of the instrument. The original 43 questions were reduced to 38 questions. The Cronbach's alpha coefficients for five constructs were .804, .872, .760, .950, and .933, all well above the .70 standard of reliability as suggested by Nunnally and Bernstein [10]. The reliability for the survey instruments as a whole is .821. Thus, internal consistency of the instrument was determined.

Data Analysis

A total of 1,086 valid surveys were collected. Among them, 580 were answered by female students. The statistical methods of stepwise regression analyses were performed to check the effects among various constructs. SPSS 15 and AMOS 7 were used to perform all statistical analysis.

Findings

There were significant differences in gender role ($p=.004$) based on different year of female college students. Younger female students had higher scores in gender role than elder female students. The statistic data regarding the gender role based on different year of female students were shown as table 1.

In the study, the social-economic status of female students was categorized in three levels based on previous studies. The social-economic score between 11 and 29 was considered as low social-economic status; 30 to 40 was middle social-economic status; 41 to 55 was high social-economic status. One-way ANOVA were used to determine whether significant differences exist in female students' gender role, self-image, and gender equality based on different social-

economic status. Though differences exist, none of them has reached significant levels.

Path analyses were performed by AMOS to determine casual relationships among variables. No significant relationship was found between perceived usefulness and network usage, and between

TABLE I. THE SCORE OF GENDER ROLE BASED ON DIFFERENT YEAR OF FEMALE STUDENTS

	year	N	Mean	Std. Deviation	Std. Error
Gender role	1	182	36.1923	5.67551	.42070
	2	171	34.8538	5.05926	.38689
	3	118	34.5000	5.67609	.52253
	4	89	33.8539	5.90368	.62579
	Total	560	35.0554	5.58321	.23593

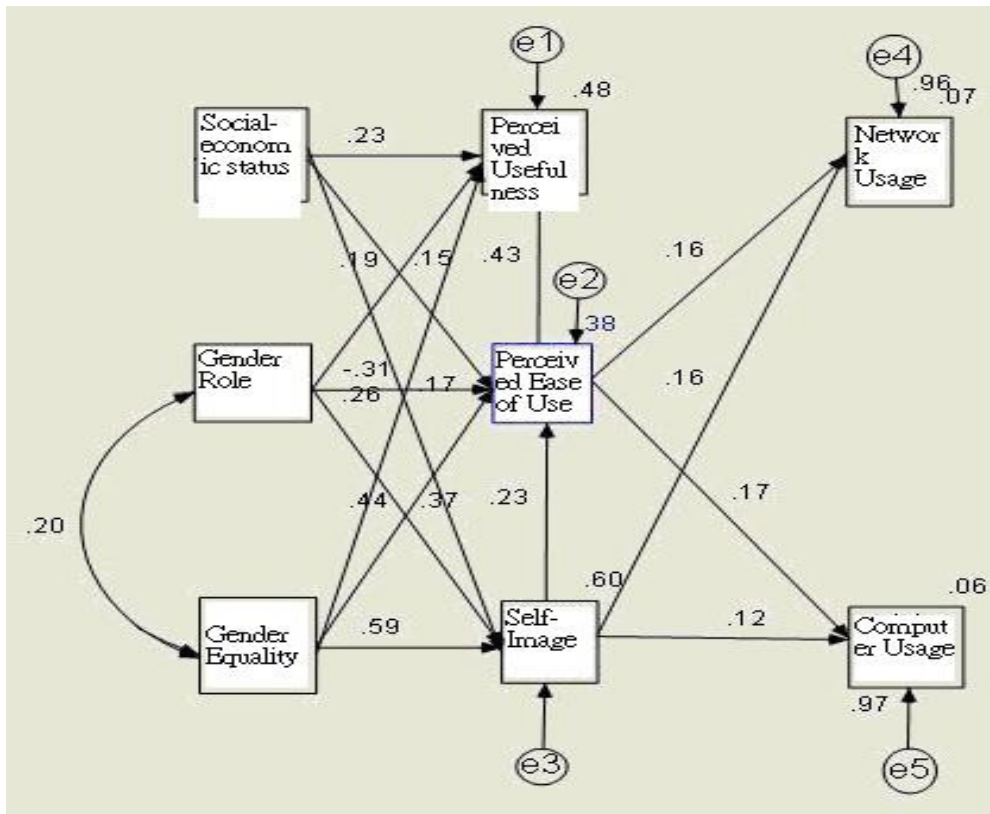


Figure 1. Casual Relationships Among Variables

perceived usefulness and computer usage. In addition, the conveniences of gender role and social-economic status, and social-economic status and gender equality were not significant. After removing insignificant paths, the casual relationships among all variables were shown as fig. 2.

In fig. 2, female students' gender role, gender equality, and their parents' social-economic status have influence on their self-image, perceived ease of use, and perceived usefulness. Self-image and perceived ease of use have impact on their network and computer usage.

External variables such as gender role, social-economic status, and gender equality accounted for 59.6% of the total variance (R²) in self-image. Gender role, social-economic status, gender equality, and self-image could explain 38.5% variance of perceived ease of use. Gender role, social-economic status, gender equality, and perceived ease of use accounted for 48.7% of variance in perceived usefulness. However, self-image and perceived ease of use could explain only 7.2% variance of network usage and 6% variance of computer usage.

The regression models for variables such as gender role, gender equality, self-image, and their parents' social-economic status, perceived ease of use, and perceived usefulness were shown as follows:

$$\text{Self-image} = .37 \text{ gender role} + .17 \text{ social-economic status} + .6 \text{ gender equality} + 6.6(1)$$

$$\text{Perceived ease of use} = -.31 \text{ gender role} + .15 \text{ social-economic status} + .44 \text{ gender equality} + .19 \text{ self-image} + 17.5 \quad (2)$$

$$\text{Perceived usefulness} = .19 \text{ gender role} + .23 \text{ social-economic status} + .26 \text{ gender equality} + .43 \text{ perceived ease of use} + 7(3)$$

In model 1, among gender role, social-economic status, and gender equality, gender role has the highest influence on self-image due to its' high coefficient.

In model 2, among gender role, social-economic status, gender equality, and self-image, gender equality has the most impact on perceived ease of use.

In model 3, among gender role, social-economic status, gender equality, and perceived ease of use, perceived ease of use has the greatest influence on perceived usefulness.

DISCUSSION AND CONCLUSIONS

The study modified Davis' TAM [9] to determine technology acceptance of female college students based on variables such as gender role, gender equality, self-image, and their parents' social-economic status.

In the study, younger female students have less stereotype of gender role than elder female students. In other words, younger female students tended to disagree traditional gender role such as "man are breadwinners; women are homemakers".

In model 2, the coefficient of gender role was negative. This indicated that higher gender role score resulted in lower perceived ease of use score. In other words, female students with less stereotype of gender role tended to believe that the computer was not easy to use. The correlation coefficient of $-.12$ also confirmed the reverse relationship between gender role and perceived ease of use.

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THE EFFECT OF SPECTATOR EXPERIENCE ON SPECTATOR
SATISFACTION AMONG SBL SPORTS FANS –
A CASE STUDY OF THE FIFTH SEASON SBL CHAMPION SERIES

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Abstract

This study aims to explore the effect of spectator experience on spectator satisfaction among sports fans. The research purposes are as follows. 1. To realize the current status of spectator experience regarding spectator satisfaction among SBL fans. 2. To explore the effect of spectator experience on spectator satisfaction among SBL sports fans. The subjects were sports fans participating in the SBL fifth season championship series. A self-structured questionnaire was designed to collect empirical data and a total number of 311 usable samples were obtained. The rate of valid returns was 77.75%. The data was tested by a LISREL hypothesis effect model. After modification, indexes of the hypothesis effect model were statistically significant, which meant the hypothesis of spectator experience toward spectator satisfaction on this study can be verified.

The conclusions of this study were as follows:

1. Spectator experience among fans was positive and moderately high. The ranking of spectator experience factors from high to low was as follows: “immersion” “emotional reaction” “stimulation” “consumption value” and “learning”. The spectator satisfaction of fans was moderately high.
2. Spectator experience showed a positive impact on spectator satisfaction. The level of spectator satisfaction was determined by spectator experience.

Keywords: Spectator Experience, Spectator Satisfaction.

Introduction

Background and Motivation of the Study

The development of professional basketball in Taiwan experienced both a glamorous and fading period from the establishment of CBA Professional Basketball League to its closing on March 4th 1999. After years of effort of government and private enterprises, Taiwan finally saw the foundation of SBL, which is considered more organized than the CBA. With the media-ESPN Channel and a supporting enterprise—Nike marketing, the First Cup of SBL became more and more professional and refined (Chen, 2005). Since the SBL super basketball league tournament started, the box office has grown from 13,000,000 to 20,000,000; the television viewing ratio has climbed from 0.23% to 0.27%, and occasionally to even 0.31%, and the television option revenue has risen from \$6,000,000 to \$35,000,000. It seems that the period that began with the founding of the SBL has marked a recovery in Taiwan's basketball. Experts who are concerned about basketball propose the same view-- the SBL's future development will meet severe challenges without doubt if there is no professional planning, brand image marketing, and competition quality properly offered for fan services.

The SBL should take the initiative during this crucial turning point to create continuative value of the basketball industry in order to impart the value of the basketball industry to fans. Creating deep emotional links with the fans is an important issue that has to be addressed. These days, marketing concept has been transferred to consumer-concerned, the same as in sports industry in order to create the advantages of industry competition. Schmitt suggested that experiencing events firsthand can leave lasting value; experience marketing can allow consumers to become involved in the process, and the value that is obtained is unique and unforgettable (as cited in Wang & Liang, 2000). Experience is a unique and valuable economic product.

Experience is a product that can create unique values. Kuo (2002) proposed that the purchasing process of sports' spectators come from experiencing the games in the scene; fans' get involved in the process of participation and interacted with these service supplier. Therefore, they get the core value of the products, and this becomes a unique value. For those sports industries which are spectator centered, the real efforts have to be made after the fans get into the playing ground. The main issue is that the sports industry must understand the real feelings of these spectators.

Kuo (2002) mentioned that under the market economy system, a sports service industry existing in society's value basically was decided in product or service that provided. When the user's degree of satisfaction rises, the potential and the value of the sports service industry also increase. Cunningham and Kwon (2003) pointed out that understanding sports consumer behavior may enable organizations to obtain direct or indirect benefits. Therefore, from sports marketing perspective, the operator must simultaneously comprehend market analysis, meet the fans' needs, and grasp the fans' expense reaction. The development of SBL industry is predicated on a great vision. Hence, this research conducted an empirical study concerning the impact of spectator experience on spectator satisfaction. The results can provide management strategies for the Taiwan basketball sports industry.

Purposes of the Study

1. To explore the current status of spectator experience and spectator satisfaction among SBL spectators.
2. To explore the effect of spectator experience on spectator satisfaction among SBL spectators

Definition of Terms

1. Spectator experience

Experience means the understanding of a target and the emotions generated by individual mental states. It comes from personal participation and experience (Joy & Sherry, 2003). It can be constructed by positive or negative moods that elicit strong feelings. The spectator experience in this study refers to and is measured by specific factors generated after SBL spectators experienced a game. These factors include the aspects of immersion, learning, stimulation, emotional reactions, and consumption value.

2. Spectator satisfaction

Satisfaction means the comparison of cost and their perspective on product effects after consumers purchase a product. Specifically, this means that consumers generate emotional reactions towards the product or the service process and apply a total evaluation of the product or the service process (Oliver, 1993). The spectator satisfaction in this study refers to the positive views or feelings generated when SBL fans were attending a game. Their degree of satisfaction was determined by their response to a set of questions that measured the aspects that contribute to fan satisfaction.

3. SBL live fans

The fans referred to throughout this study are sports fans who participated by attending live games during the SBL fifth season championship series.

Limitation of the Study

After a review of the relevant literature, all the elements that might influence spectator experiences were included in this paper. However, there were likely still some other elements related to spectator experiences might be important, but were not included in the measurement of the spectator experience. Therefore, this study restricted its analyses to the factors collected within the range of this survey.

Methodology

Research Participants

Pilot Study

A pilot study was conducted on April 1 & 2, 2008 at the first round of SBL games (Pu-Yuan vs. Yu-Long, Mi Di Ya vs. Taiwan Beer) 50 surveys were distributed at each game. A total of 200 surveys were distributed during four games. 157 valid surveys were completed and returned. This represented a 78.5% return rate.

Formal Study

A formal study was conducted on May 10 & 11, 2008 in the first four games (Yu-Long vs. Taiwan Beer) of the fifth season SBL champion series. The participants for this study were fans attending these events. A convenient sampling method was adopted for selection of 100 participants at each event. 400 surveys were distributed. 311 were considered valid. This represented a 77.5% return rate.

Research Instruments

A questionnaire developed by Huang (2006) was amended in this study: "Spectator Experience & Satisfaction on Vocational Sports". The specifics of the amended models were as follows:

1. Spectator Experience

Spectator experience consisted of 37 items in 5 dimensions: "immersion" "learning" "emotional reaction" "stimulation" and "consumption Value". A 5-point Likert scale was used for intensity ratings from 1 (totally inconsistent) to 5 (totally consistent).

2. Spectator Satisfaction

Spectator Satisfaction consisted of 6 items and used a 5-point Likert scale for intensity ratings from 1 (totally inconsistent) to 5 (totally consistent).

Reliability and Validity of Instrument

Validity of Pilot Study

Discrimination Analysis.

The collected data of 157 surveys was filed by SPSS for Windows 12.0 after the invalid surveys were discarded. Followed by the process of discrimination analysis, the highest and lowest of 27% scores was adopted as a critical ration, which divided all scores into two groups -- a high-score group and a low-score group. Data was further analyzed by independent sampling t-test. Preliminary analyses resulted in the fifth item of “emotion reaction” being discarded because it failed to load adequately on a single factor. The t-value for the rest of the items is -4.18~-9.87 $p < .05$, which showed that the remaining items had achieved significant levels and were legitimate for further exploratory factor analysis.

Exploratory Factor Analysis of Pilot Study

The pilot study questionnaire consisted of two scales—spectator experience and spectator satisfaction. The exploratory factor analysis resulted in 26 items being retained on experience scale after rotation by SPSS 12.0, accounting for 56.56% of the cumulative variance in the data. On the satisfaction scale, six items were analyzed by exploratory factor analysis, which resulted in one factor emerging and being titled as spectator satisfaction, accounting for 48.23% cumulative variance in the data.

Reliability of Pilot Study

The reliability index used for this study was Cronbach α coefficients. Cronbach α coefficients for each experience sub-scale was from .819 ~ .874, Cronbach α coefficients for the

total experience scale was .906. Cronbach α coefficients for the satisfaction scale was .829. According to these indices, the Cronbach α coefficients were acceptable with high inner consistency.

Results and Discussions

The Current Status of Spectator Experience and Spectator Satisfaction

The Current Status of Spectator Experience

There were 5 dimensions within the spectator experience of fans attending these games. According to table 1, The [immersion] factor within spectator experience achieved a total mean of 3.95, SD=0.37. As the total mean was higher than 3 (normal) and the total mean (M=3.95) was close to 4 (consistent), this meant that the [immersion] level of spectators at those games was close to high. The [learning] factor had a total mean of 3.42, SD=0.34. As the total mean was higher than 3 (normal) and fell between 3-4, it meant that the [learning] level of spectators at games was only normal. The [stimulation] factor had a total mean of 3.81, SD=0.36. The total mean was higher than 3 (normal) and was close to 4. This indicated that the [stimulation] level of spectators at games was high. The [emotional reaction] factor had a total mean of 3.89, SD=0.31. This total mean was higher than 3 (normal) and close to 4. This meant that the [emotional reaction] level of spectators at games was also high. The [consumption value] factor had a total mean of 3.65, SD=0.37. As this total mean was higher than 3 (normal) and was close to 4, it showed that the [consumption value] level of spectators was close to high with a positive impact.

According to the aforementioned results, the characteristics of SBL fans were that they were immersed in competitive games, focused on sensational experience, had a need to enjoy leisure time and wanted to be entertained, but have a low learning requirement. This also showed

the unique values of the SBL industry. It revealed that the SBL champion series offered unique experiences such as sensational stimulation, emotional reaction, leisure fulfillment and entertainment, for fans attending the games.

Table 1. Summary of Spectator Experience on Descriptive Statistics

Experience Dimensions	Population	Mean	SD
immersion	311	3.95	0.37
learning	311	3.42	0.34
stimulation	311	3.81	0.36
emotional reaction	311	3.89	0.31
consumption value	311	3.65	0.37

The Current Status of Spectator Satisfaction

The results of spectator satisfaction levels of fans attending SBL Champion Series Games are presented in table 2. The total average was $M=3.62$, $SD=0.47$, and total average of each question ranged from 3.41 to 3.87. The highest item was 3.87—「I felt great but not totally satisfied」, and the lowest item was 3.41—“I feel both of the teams did a great job in spite of winning or losing”. The total mean of each question was above 3, and the M was 3.62, close to 4. The results showed that the level of spectator satisfaction was moderately high.

The results illustrated that fans expressed moderately high satisfaction levels after watching SBL Champion Series Games. The fans thought the games were much more exciting than they expected. This revealed that fans received a positive experience while watching the games and the SBL Champion Series Games offered a unique service value.

Relations between Spectator Experience and Spectator Satisfaction among Fans

The Hypothesis Model of Spectator Experience Affecting Spectator Satisfaction.

Table 2. The Summary Of Descriptive Statistics Of The Questions Of Spectator Satisfaction

	Items	Mean	SD
Spectator Satisfaction	I feel great but not totally satisfied	3.87	0.56
	This game is marvelous than I expected.	3.76	0.62
	I enjoy this game very much.	3.64	0.49
	I was satisfied with this game.	3.53	0.59
	After watching this game, I feel it is a wonderful day today.	3.48	0.51
	I feel both of the teams did a great job in spite of winning or losing.	3.41	0.51
	Total	3.62	0.47

According to many empirical studies, spectator satisfaction is affected by spectator experience. The hypothesis for this study is that spectator experience has an impact on spectator satisfaction and can be verified by LISREL. The observed variables (X, Y) and latent variables (ξ , η), 6 observed variables in total and 2 latent variables in total, which separately named spectator experience(ξ_1) and spectator satisfaction(η_1). The model of cause and effect was the relations between latent variables and endogenous latent variables, therefore the latent variable was spectator experience (η_1), and endogenous latent variable was spectator satisfaction (η_1).

The Verification of Total Fit Index on Research Hypothesis Model

When tested by LISREL 8.50 as a verification of the hypothesis model, the first test resulted in confirmation indicators: $\chi^2_{(31)}=153.72$ (p= .001), RMSEA=0.125, p=.02, GFI=0.88, CFI=0.71, Standardized RMR=0.09, AGFI=0.85. By observing the confirmation indicators shown above, this hypothesis model did not adequately achieve statistically significant levels. Therefore, it was necessary for path modification to be conducted on variables among the models. Without violating research models and relative theory, a model modification by LISREL 8.50 was conducted, which resulted in the correlations among four

variables consistent with the hypothesis in this research. They were four disturbance correlations in spectator experience as follows: immersion (δ_1) and emotional reaction(δ_4), stimulation(δ_3) and emotional reaction(δ_4), stimulation(δ_3) and consumption value(δ_5), emotional reaction(δ_4) and consumption value(δ_5) (see Table 3).

Table 3. Summary of Fit Index after Modification

Confirmation indicator	First confirmation	Model after modification
χ^2 test	$\chi^2_{(31)}=153.72$ (p= .001) $\chi^2/df=4.96$	$\chi^2_{(27)}=52.39$ (p= .054) $\chi^2/df=1.94$
root mean square error approximation	RMSEA=0.125 (p= .002)	RMSEA=0.044 (p= .61)
Standardized root mean square residual	Standardized RMR=0.09	Standardized RMR=0.43
goodness of fit index	GFI=0.88	GFI=0.93
adjusted goodness of fit index	AGFI=0.85	AGFI=0.93
comparative fit index	CFI=0.71	CFI=0.91
t-value	t-value >1.96	t-value >1.96

According to Table 4, the factor loading of observed variables toward latent variables was significant; the t-value was greater than 1.96, which revealed that the hypothesis model and the observed data carried a reasonable fit index. Through index after modification, the verification of hypothesis effect model on fit index $\chi^2_{(27)}=52.39$ (p= .054), RMSEA=0.044(p= .61), GFI=0.93, CFI=0.91, Standardized RMR=0.043, AGFI=0.93. t-value of estimated coefficients higher than 1.96, which indicated that the hypothesis effect model after modification

Table 4. Summary of Estimated Coefficients of Hypothesis Model

coefficient	estimated coefficient	t-value	standardized coefficient	R ²
$\lambda(X1)11$	0.15	6.78	0.43	0.19
$\lambda(X2)21$	0.04	2.25	0.13	0.02
$\lambda(X3)31$	0.19	10.61	0.60	0.36
$\lambda(X4)41$	0.25	16.23	0.74	0.55
$\lambda(X5)51$	0.15	10.63	0.54	0.29
$\lambda(Y1)11$	1.00	7.32	0.79	0.21
γ_{11}	0.26	7.51	0.88	0.77
ζ_1	0.02	11.31	0.48	0.23
δ_1	0.10	11.81	0.81	
δ_2	0.08	14.35	0.98	
δ_3	0.07	10.51	0.64	
δ_4	0.05	12.68	0.45	
δ_5	0.05	12.77	0.71	
ε_1	0.32	12.99	0.79	

Table 5. The Impact of Spectator Experience on Spectator Satisfaction

Spectator satisfaction	spectator experience factor dimension					Spectator experience
	immersion	learning	stimulation	Emotional reaction	consumption value	
direct effect	0.38	0.11	0.53	0.65	0.48	-
indirect effect	-	-	-	-	-	0.88
Total effect	0.38	0.11	0.53	0.65	0.48	0.88

could be explained the observed data in this research.

The Effect of Spectator Experience on Spectator Satisfaction

The data provided by fan samples from the SBL According to figure one, there were six paths identified by the impact of spectator experience on spectator satisfaction and all reached significant levels ($t=2.25\sim 16.63 > 1.96$). The first path was spectator experience directly affects spectator satisfaction (γ_{11}), direct effect measured $\beta=0.88$, the second to sixth paths were indirect effects (the observed variables affecting latent variables through observed variables affecting endogenous latent variables) (see Table 5). The impact of spectator experience on spectator satisfaction was statistically significant, accounting for 77% of variance in the data. The indirect effects of factors affecting spectator satisfaction from the highest to the lowest were as follows: emotional reaction ($\beta=0.65$), stimulation ($\beta=0.53$), consumption value ($\beta=0.48$), immersion ($\beta=0.38$) and learning ($\beta=0.11$).

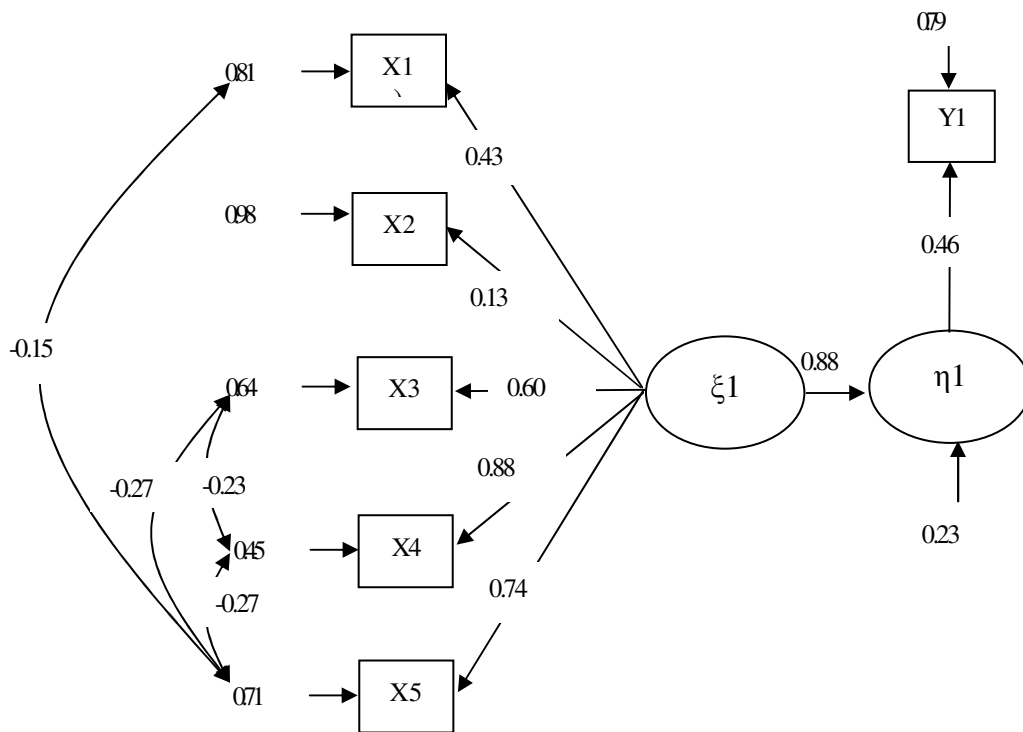


Figure 1. The Path Diagram of Spectator Experience Affecting Spectator Satisfaction after Modification

Conclusion and Suggestions

The Analysis of Spectator Experience Impacted Spectator Satisfaction

Spectator experience had a positive impact on spectator satisfaction for the fans who watched SBL Fifth Season Championship series. This means greater the fans' impression of a positive experience, the higher their degree of satisfaction. Liao (2004) found that the factors that constitute spectator experience have a positive impact on spectator satisfaction. Lee (2005) & Huang (2006), in their studies of SBL spectators in attendance at a game, got a consistent result in regards to the relationship of spectator experience to spectator satisfaction. They found that positive spectator experience has a positive impact on spectator satisfaction. Other studies such as Jiang (2004), Qiu (2003), and Chen (2004) also stated that the spectator experience has a direct impact on spectator satisfaction, and the more positive the spectator's experience, the higher the spectator's satisfaction. The findings of aforementioned studies were consistent with the results of this study, and reinforced the concept of "Experiential Marketing". The consuming experience can provide different and special product value. It can help raise consumer's satisfaction and show that spectator experience has an irreplaceable consumption value.

Among the indirect effects of the experiential factors that can contribute to spectator satisfaction, the emotional reaction was the highest, and stimulation the second. As Lee (2005) pointed out in his study—"emotional experience" has a positive impact on spectator satisfaction. "Emotional experience" had a key impact on experiential process. As Kuo (2002) suggested the characters of professional sports, through the process of competition, embody strong emotional reactions, which in turn illicit feelings of excitement, stimulation, and tension within the spectators. These stimuli create a corresponding emotional reaction in the fans. This intense stimulation is part of the draw for the spectators. This is partially what the fans pay for when

they attend a game. Moreover, this experience can alleviate personal stress by eliciting strong emotions that are only connected to extra-personal events.

Conclusions

1. The Current status of Spectator Experience and Spectator Satisfaction

The total spectator experience responses from fans attending the fifth seasonal SBL championship series were positive and moderately-high. The ranking of spectator experience factors from high to low was as follows: “immersion”, “emotional reaction”, “stimulation”, “consumption value” and “learning”; and the total spectator satisfaction responses from fans were also moderately-high level as well.

2. The Impact of Spectator Experience on Spectator Satisfaction

The spectator experiences of fans attending the series showed a positive impact on spectator satisfaction. The level of spectator satisfaction was determined by that of spectator experience. The indirect-effect ranking of spectator experience factors on spectator satisfaction was, in order, as follows : “emotional reaction” as the highest, “stimulation”, “consumption value”, “immersion” and “learning” as the lowest.

Suggestions

1. Based on the research findings, enhanced responses to spectator experiences can raise spectator satisfaction levels. This indicates that spectator experience is a unique economic product. A comprehensive appreciation of fan experience and feelings can create unique industry values within the SBL.

2. The emotional reaction factor within the fans’ spectator experiences was an important factor among total effect models. Specific needs require fulfillment when fans attend games. If the degree of satisfaction needs to be elevated, supporters’ association members can purposefully

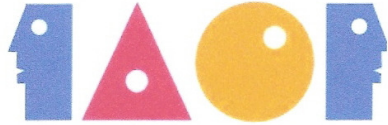
create a positive atmosphere at the game. The creation of a highly charged atmosphere can help fans release emotional tension and encourage fan interaction. This creates the effects of both leisure and entertainment and can positively affect the degree of fan satisfaction.

3. According to these research findings, spectator experience is an important cause-factor regarding the behavior of attending fans. It will directly affect the degree of spectator satisfaction. A detailed understanding of the process by which spectator experience is attained and enhanced will require further research in the future. The relative importance of other factors, such as participation motives, spectator patterns, degree of participation and spectator cost, that affect the spectator experience will be important aspects of future fan satisfaction studies that will merit specific attention.

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AN ALGORITHM TO BUILD STATE TRANSITION DIAGRAM TREES FOR GENERATING TEST CASES – A CASE STUDY OF STATE-BASED TESTING

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Abstract

For intra-class testing, some techniques (tools) cannot completely generate all test cases for the coverage of states, transitions and paths. In order to do that, in this research, the author proposes threaded multi-way trees, called threaded state transition trees, to duplicate the behavior of the state transition diagrams of classes under test. The circular paths in the threaded trees can correspond to the circular transitions in the diagrams. In addition, an algorithm is also given to build the threaded trees in this paper. This tree is going to be developed to automatically generate sequences test messages and to work as test result inspector in the future work. Some other tools transformed from state transition diagrams to generate test cases are introduced; moreover, the limitation and drawback of them are also discussed.

Keywords: Class Testing, Test Cases Generation, State-Based Testing, State Transition Diagrams

Introduction

Computer software has errors. This is a basic truth of software development today. To improve the quality of software products, many testing techniques have been proposed. In object-oriented class testing, there are three further levels: intra-method, inter-method and intra-class testing. The main focus in this research is at intra-class testing, which refers to the testing of interactions among the components of an individual class.

The quality of test cases is evaluated by the number of coverage of the software under test

(Tsai, 2005). Such as for real time system testing strategy, that all-states, all-events, all-actions and all-transitions have been exercised at least once is minimum required (Mathur, 2007), (Mahmoud, 2006). State transition diagram that can be used to describe the behavior of object class under test is good tool for generating test cases. State transition diagrams for classes may contain states, events, conditions, transitions and actions. These diagrams then can be used to direct testing efforts by identifying the states, events, and transitions that should be tested. In intra-class testing, state transition diagrams facilitate the generation of test cases for testing whether or not the object of the implemented class (under test) works as required. This paper proposes an algorithm to build threaded state transition trees for automatically generating sequences of test cases to achieve all-state and all transition coverage but also all-path coverage that is a strong level of testing coverage (Tsai, 2005).

The paper is organized as follows. The concepts of state-based testing, state transition diagrams and three tools for generating test cases are introduced in section 2. To overcome the weaknesses of state transition trees, a threaded state transition tree (or called a threaded multi-way tree) that will be proposed in section 3 can duplicate the behavior of a state transition diagram. In this section, the structures of the threaded tree and an algorithm for building the tree are explained with examples. The last section contains summary and future work.

Related Work and Background

State-Based Testing

The main idea of state-based testing is to examine the interactions within a class by monitoring the changes of states (attributes' values). The changing states rely on the values that are changed by the transitions, and errors are detected by testing states of an object. Feasible method sequences, which are generated along with the state transition diagram of the class, can

be used to check whether the objects of the class under test follow the methods sequence patterns required by the diagram.

State Transition Diagrams

State-Transition diagrams that are excellent tools to capture certain system requirements describe states and their associated transitions. These diagrams then can be used to direct testing efforts by identifying the states, events, and transitions that should be tested. In intra-class testing, state transition diagrams facilitate the generation of test cases for testing whether or not the object of the implemented class (under test) works as required.

The Definition of a State Transition Diagram

In this research, a *state transition diagram* only contains states, transitions and events, although Booch, (1994) proposed that state transition diagrams for classes may contain states, events, conditions, transitions and actions. An action is an operation and is associated with an event. Rumbaugh et al.,(1991) stated “*A state can be defined in terms of a condition; conversely, being in a state is a condition.*” For deriving sequences of test messages and parsing test results, only the states and events are used.

States.

The state of an object is determined by the values of its attributes. Sets of values are grouped together into a state according to properties that affect the behavior of the object (Rumbaugh et al., 1991). This also means that the states of an object can be formed by the sets of state values. The object of a class may have a large range of state spaces (values).

As the state values of the *queue* object are one, two, three and four, the object has both *insertion* and *removal* behaviors. The object has only *removal/insertion* behavior when its state value is five/zero. Therefore, the substate-value sets of the *queue* are {0}, {1, 2, 3, 4}, and {5},

and each set is a state with a name. A state is drawn as a circle node containing a unique name (e.g. Empty, NotFull, and Full) in the *state transition diagram* of the *queue* class, see Figure 1.

Events.

An event causes the state of an object to change (Booch, 1994), and it serves as a marker for a particular time when the state change occurs. Events are sent from client objects and replies may be expected. When an object receives an event, the state changing to the next state depends on the current state and the event. This implies that the current state is a precondition, when it is true, the event triggers some actions, and then the state is changed. This state change is a post condition of the event.

Transitions

A state transition represents the fact that an event's occurrence causes the state of an object to change. Each transition is drawn as a direct arc to connect two states, see Figure 1. A state may be a source state and target state of a transition (i.e. it has a state transition to itself), and a state may have many different unique state transitions. These are labeled with the events that cause the transitions, and point to the next states. A transition will not be triggered except when its precondition is true, and after execution its post condition must be true.

Before constructing a state transition diagram for a class, the designer needs to check whether the distinct events can be classified, the states can be abstracted and the significant event order can be found. Additionally, the class objects, which will be represented as *state transition diagrams*, can be restricted as follows:

- there are a finite number of states and transitions;
- the behavior of the object can be defined with the states;
- the transitions between the states depict the state change;

- all states can be reached from the initial state; and
- each state has a unique name.

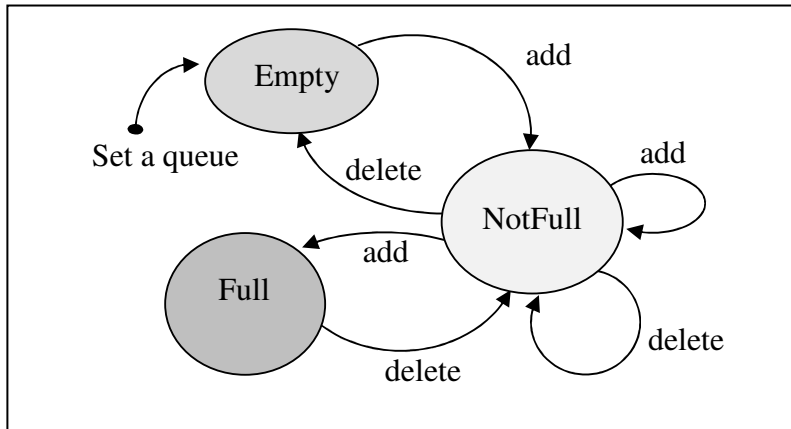


Figure 1. The state transition diagram of the *queue* class

There are several ways to describe a systematic method for creating a state transition diagram. The method discussed here is not the only one. State transition diagrams for classes may contain states, events, conditions, transitions and actions. However, in this research, a *state transition diagram* only contains states, transitions and events. The reasons are: (1) an action is an operation and is associated with an event, (2) “A *state can be defined in terms of a condition; conversely, being in a state is a condition*” (Rumbaugh et al., 1991), and (3) only the states and events are used to generate sequences of test cases. A bounded *queue* state transition diagram is drawn in Figure 1. This *queue* class will also be used as the example in the whole paper.

Assume that the bounded *queue* class can only store five units of data and has *add* and *delete* methods. The *queue* class state transition diagram may contain three states: empty, notfull and full. The diagram in Figure 1 is used in an object of *queue* for describing its state changes and behaviors. The *add/delete* transition which emerges from the *NotFull* state to itself in Figure 1.

Table 1. One-dimensional State Transition

Table for the *queue* Class

Current state	Event	Action	Next State
●	—	set a queue	Empty
Empty	—	—	Empty
Empty	add	—	Notfull
Empty	—	—	Full
Notfull	delete	—	Empty
Notfull	add	—	Notfull
Notfull	—	—	Notfull
Notfull	add	—	Full
Full	—	—	Empty
Full	delete	—	Notfull
Full	—	—	Full

[Note] — : impossible transition

Table 2. Two-dimensional State

Tran. Table for the *queue* Class

Next State Current State	Empty	Notfull	Full
Empty	—	add	—
Notfull	delete	add	add
Notfull	—	delete	—
Full	—	delete	—

[Note] — : impossible transition

The test cases for testing the *queue* class can be generated from using different tools (i.e. graphs, stat transition tables and state transition trees) that are transformed from the state transition diagram. Take the *queue* example, in this paper, the author proposes a threaded state transition tree that is transformed from the queue diagram and duplicates the behavior of the *queue*. Before that, graphs, stat transition tables and state transition trees are given and discussed as follows.

The Limitation of Graphs

Graph Representation

State transition diagrams are similar to directed graphs. To write programs that process and manipulate state transition diagrams as graphs can be represented in adjacency matrices and adjacency list. An adjacency matrix is a two-dimensional $n \times n$ matrix, if it has n vertices. Such

that the (i, j) th entry of the matrix is 1 if there is an edge from vertex i to vertex j ; otherwise, the (i, j) th entry is zero. But this matrix can not show the states and the transitions in the state transition diagram.

In the adjacency list representation, an array, A , of size n is used if there are n vertices. Each element of array $A[i]$ is reference variable pointing to the first node of the linked list containing the vertices to vertex i is adjacent. Each node in the linked list has vertex and link components, the component vertex contains the index of the vertex adjacent to vertex i . However, this format cannot show the paths of the state transition diagram.

Graph Traversals

Traversing a graph is similar to traversing a binary tree, but traversing a graph is a bit more complicated. A graph might have cycles and the graph might not be entirely traversed from a single vertex. The two most common graph traversal algorithms are the depth first traversal and breadth first traversal (Malik, and Nair, 2003). These two algorithms ensure that the entire graph is traversed, that all vertices have been visited. If the state transition diagrams are traversed using the above two algorithm and test cases are generated, then these test cases only cover each state and/or each event. These are weak level of test coverage. Additionally, adjacency matrices and adjacency lists cannot represent the diagrams that have loop transitions, so that the generated test cases do not contain loop transitions.

The Limitation of State Transition Table

One-dimensional state transition tables consist of four columns: Current State, Event, Action, and Next State. The state transition table transformed from the *queue* state transition diagram shows in Table 1.

An example of a two-dimensional state transition table for the *queue* class is given as Table 2, in which the vertical dimension indicates current states, and the horizontal dimension indicates next states. The cells (row/column intersections) in the table contain the event which will lead to a particular next state. The advantage of a state-transition table is that it lists all possible state-transition combinations, not just the valid ones. Using the table can help detect defects in implementation that enable invalid paths from one state to another. However, the disadvantage of such tables is that they become very large very quick as the number of states and events increases. Additionally, the tables are generally sparse, and most of the cells in the table are empty. For generating test cases, all feasible test cases cannot be easily generated by directly reading the state transition table row by row.

The state transition table is unable to generate a test case that contains loop transitions, such as the *Notfull* state has a *delete* transition to *Notfull* state as well as has an *add* transition to itself, but is shown in Figure 1. Testing of loops such as these can be important because they may result in accumulating computational errors.

The Limitation of State Transition Trees

To Build a State Transition Tree

A method to produce test cases from state transition sequences is to prepare the *state transition tree* that is derived from the state transition diagram of the class under test. The nodes of the state transition tree represent the states in the diagram. The edges of the tree represent the transitions that are between the states, see Figure 2.

The initial state in the *queue* state transition diagram becomes the root node, and each transition out of the initial state is a branch to a node representing the resultant state of the transition. This is repeated for each subsequent state in the diagram to build the tree until the

node already appears on the previous level or the node corresponds to a final state in the diagram.

A sequence or a single test case is obtained by tracing each full or partial path in the tree. For example, a sequential test case $\langle \text{Empty}, \text{add}, \text{NotFull}, \text{delete}, \text{Empty} \rangle$ for the *queue* is produced by following the bold branches in Figure 2.

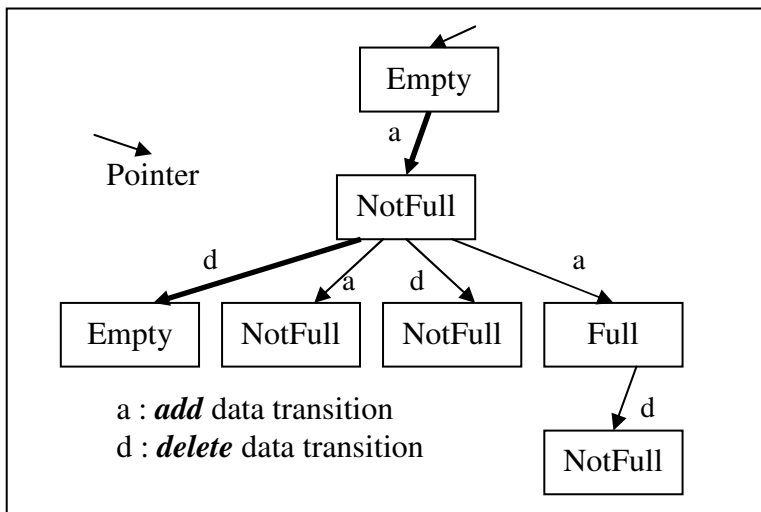


Figure 2. The state transition tree of the queue class

The Drawback of State Transition Trees

A limitation of state transition trees is that all feasible test cases cannot be completely generated by tracing the paths of the tree. The reason is that state transition trees are unable to completely represent the behavior of state transition diagrams.

The tree can produce a test case, which deletes data from an object in order to change the object's state from *NotFull* to *Empty*, but the tree is unable to generate a test case which contains loop transitions. For example, two data units sequentially deleted from a *NotFull* state *queue* object, and the object remains at the same state: *NotFull*. Moreover, the state of the object is changed from *NotFull* to *Full*, as it already has four units of data when a new one is added. This shows that state transition trees do not have the capability to represent the behavior of state

transition diagrams, so that they may not be able to produce all feasible test cases, but parts of them.

The Benefit of Threaded State Transition Trees

Threaded State Transition Trees

In order to automatically produce all possible test cases, a threaded state transition tree is proposed here. The tree is also derived from a state transition diagram of the class under test and may contain the information of transitions and states on the diagram. The threads used in a state transition tree enable the tree to simulate the graph of a state transition diagram. In practice, moreover, trees are usually easier than other tools discussed above to be employed to automatically generate test cases.

Figure 3 illustrates the threaded state transition tree of the *queue* class. The tree can model the circular paths to represent the circular transitions on the *queue* diagram using the pointers and threads. Thus, traversing the cycles from the tree root node can generate all test cases.

Duplicating the Behavior of State Transition Diagrams

To transform a state transition diagram into a threaded tree, a threaded arc is added in each node of the state transition tree in order to point back to the node having the same state name in the previous level. The mapping between the threaded state transition tree and the state transition diagram (in Figure 4) shows that the threaded tree can be formed from the diagram in Figure 1 and that it can completely represent the behavior of the *queue* object.

The pointers and threads in the tree can simulate any cyclic links in the diagram. There are several circular paths in Figure 4 that begin from and go back to the root node. These paths are the same as the circular transitions in the state transition diagram.

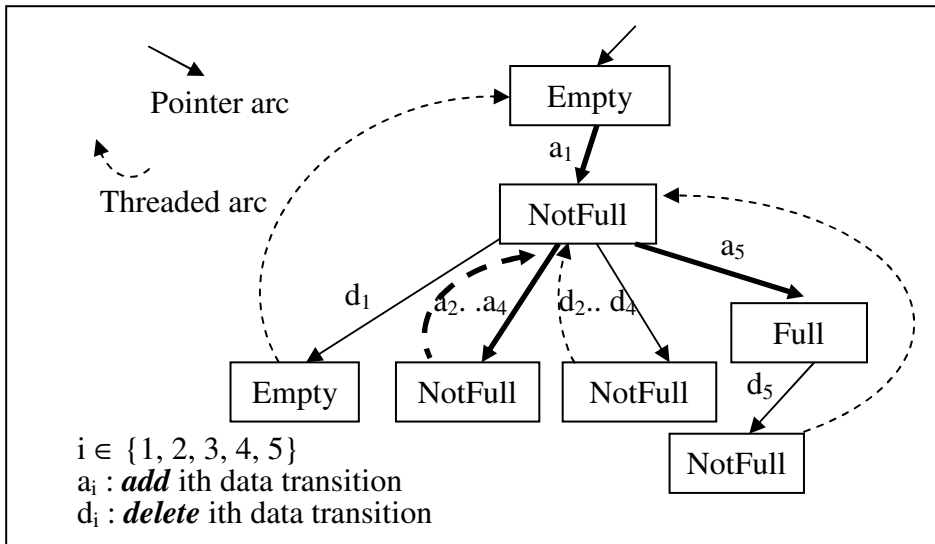


Figure 3. The threaded state transition tree of the queue class

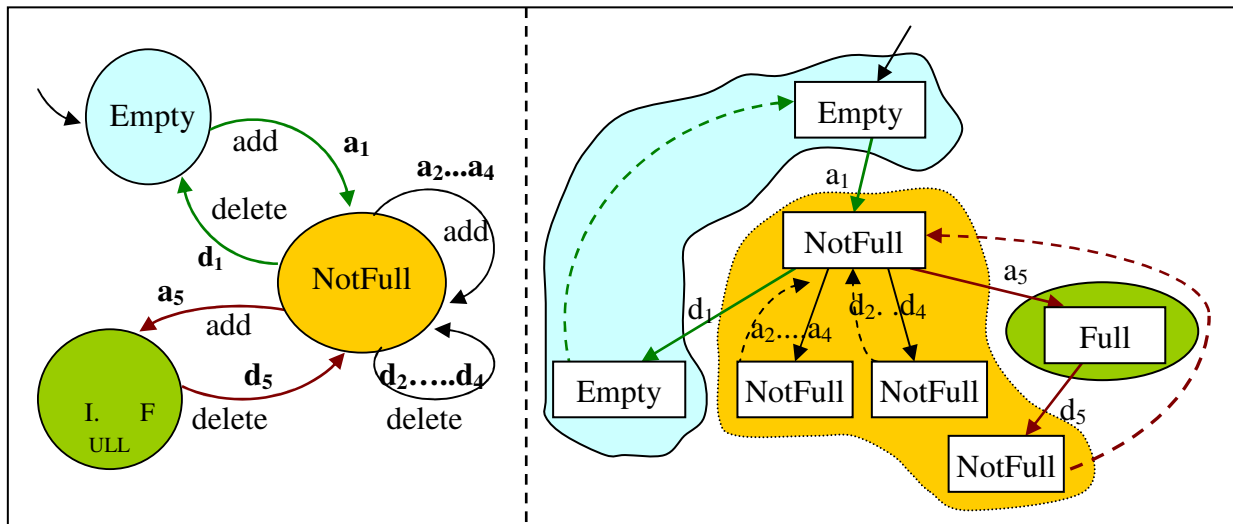


Figure 4. The mapping between the queue's state space diagram and threaded state transition tree

The Tree Node Structure

There are five fields in each node of a threaded tree corresponding to a state node in the diagram of the class under test. The tree node's structure diagram is shown in Figure 5. The information for each field (except the *loop* field) is obtained from the state transition diagram of the class.

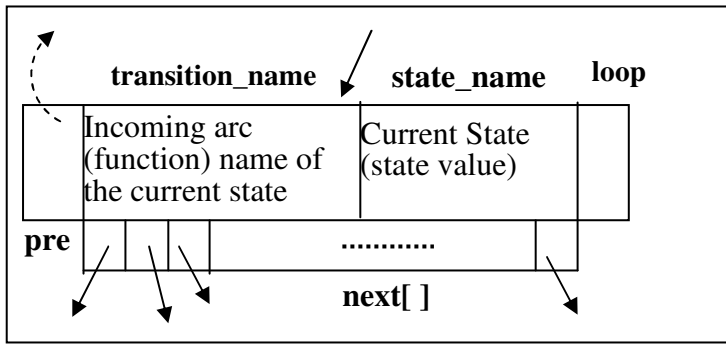


Figure 5. The node structure of the threaded tree

A transition corresponding to an emerging transition of the previous state is stored in the *transition_name* field. For example, the *add* name shown in the middle tree node in Figure 6.

The *state_name* field in the node contains a post condition (i.e. post-state) of the transition (also called event) executed. This is also the target state name of its corresponding transition in the diagram. The *pre* pointer field points to the previous node. If a transition is executed and the state is still the same as the highest previous node's, then *pre* leads back to the previous node. In Figure 6, for example, after executing the *delete* event in the lowest node, the state is *Empty* which is the same as the empty state in the highest node in the figure.

The *next[]* field is a pointer array, in which each element points a child node (next state in the diagram). Of course, the size of the array is determined by the greatest number of transitions emerging from a state in the diagram. The value in the *loop* field is used as a flag to determine the number of times that the transition will be reapply executed. Hence, the threaded state transition tree of the *queue* class is drawn and given in Figure 6.

The Steps of building a Threaded State Transition Tree

The nodes and edges in the tree represent the states and transitions on the diagram respectively. The steps of transforming the diagram into the threaded tree are:

- 1) The initial state in the diagram is the root node in the tree.
- 2) The next possible states of the initial state in the diagram are the child nodes of the root node on the tree. This is repeated for each next state in the building of the tree until:
 - (1) the node corresponds to a final state in the diagram; or

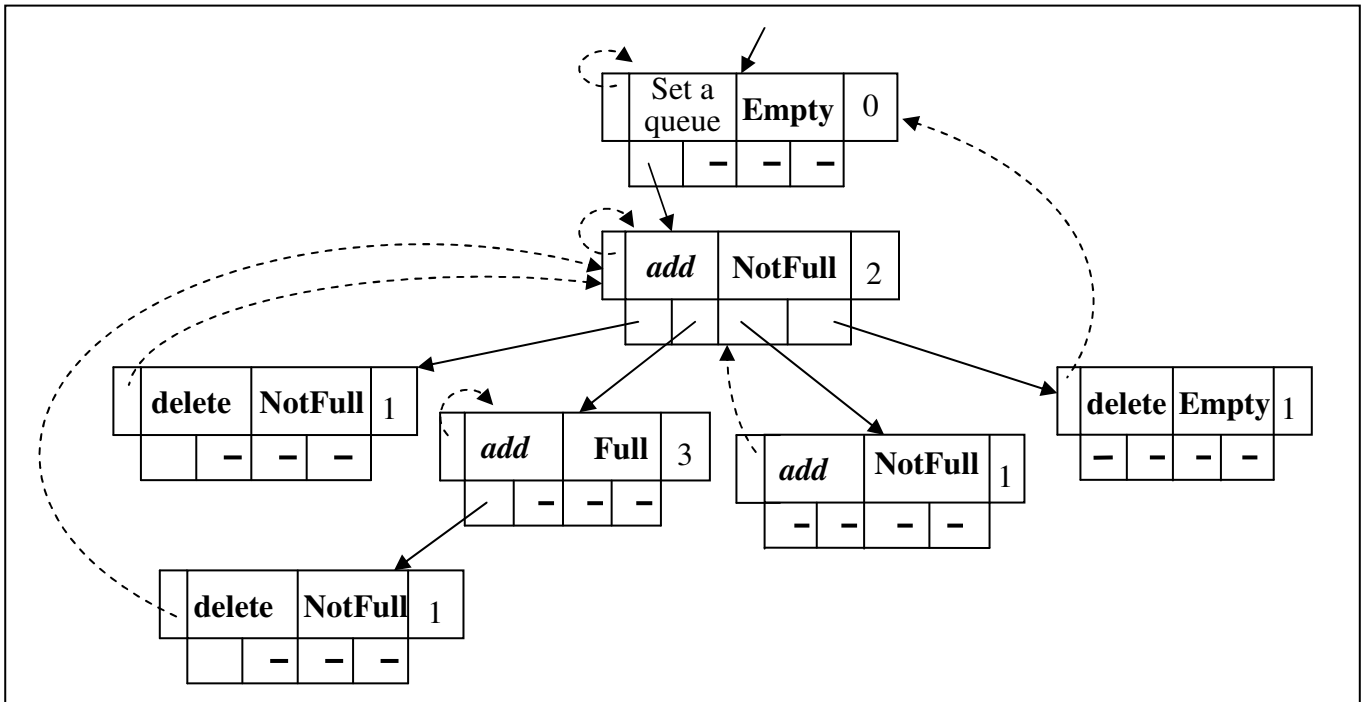


Figure 6. The Threaded State Transition Tree of the *queue* Class

- (2) the node already appears at the previous level(s); if so,
 - the thread arc in the node points back to the node (with the same name) at the previous level; but
 - if the same name nodes exit at the different previous levels, the thread arc points back to the node that is at the highest level.

An Algorithm to build the Threaded Tree

The threaded state transition tree structure in Figure 6 is not the only possible structure. A different tree structure may be constructed using the same algorithm for the diagram with different traversing paths. The child nodes (i.e. target states) of a node (i.e. source state) are at the same level on the tree, but have different orders at the level.

The threaded tree is built level by level using a queue. When a non-leaf node at level N is allocated, it will be added into the queue. It will be removed from the queue at once while all of its child nodes at level N+1 are allocated and linked with it. The tree will grow level by level until all nodes (leaves) at the lowest level are linked to the tree. The algorithm to build the tree is illustrated in Figure 7.

```
// Need a pointer queue to build up a tree level by level
Step 1 Create a pointer queue which can temporarily store tree nodes
Step 2 Create the head node of the tree and fill the required information in each field
Step 3 Add the head node into the queue
Step 4 While not stop building the tree
Step 5     Create a new node and fill the required information in each field
Step 6     While the new node is not a child of the first node in queue
Step 7         Delete the first node from the queue
Step 8     Link the new node as a child of the first node in the queue
Step 9     If the state_name of a node in the queue is the same as the new node's
Step 10         the pre of the new node threads to the node in the queue
Step 11     Add the new node into the queue
```

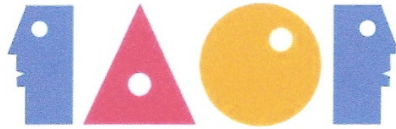
II. FIGURE 7. THE ALGORITHM TO BUILD A THREADED TEST CASE (STATE TRANSITION) TREE

Summary and Future Work

This paper has discussed the threaded state transition tree which is transformed from the state transition diagram of the class under test. The main reason for using a threaded multi-way tree instead of a state-transition tree is that the former can provide the ability to automate the class test tool. The mapping between a threaded state transition tree of a class and the state transition diagram of the class has been demonstrated as well to reveal that the tree can completely duplicate the behavior of the diagram. Furthermore, the threaded tree is not only more useful for automatically generating test cases but also can be used in test result inspection that is under developing as a future work.

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INNOVATIVE SERVICES IN FITNESS CLUBS: PERSONAL TRAINER COMPETENCY NEEDS ANALYSIS

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ABSTRACT

In response to market demands, the fitness club industry has developed a one-on-one personal trainer course as one of its innovative services, which provides customers with a more customized professional exercise program. With this kind of service becoming increasingly popular in Taiwan, the fitness club industry has managed to raise both its innovativeness and expand profitability. However, few of the related studies have considered the role of personal trainers in a fitness service. Therefore, this study explores the competencies required by personal trainers via a literature review and in-depth interviews. Based on the research results, recommendations are proposed as a reference for the fitness clubs and personal trainers that are aiming to improve their service operations.

Keywords: Personal Trainer, Competency, Needs Analysis, Fitness Club

Introduction

Personal trainers are seen as the heart of innovative services in a professional fitness club. They not only provide professional instruction, but also a customized service in the training courses they conduct. In the past, the instructors in a fitness club served to provide services on the site, spread knowledge of sports and health, and manage the club with regard to safety, hygiene and equipment maintenance. A personal trainer is now expected to be more than an instructor,

and, in addition to the conventional competencies required of an instructor, must also possess stronger abilities with regard to social interaction in order to form close relationships with club members and demonstrate personal charisma. It is now a global trend for personal trainers in sports to be accredited with an international trainer certificate. A qualified trainer is able to prescribe the optimal exercise course for a club member according to their individual conditions and health needs.

In general, the competency required of personal trainers can be cultivated through company-designed educational training programs or via an accredited certification system. In Taiwan, there are very few certification tests for personal trainers, as well as a lack of research concerning the competency of personal trainers. This study thus aims to examine the necessary competencies of personal trainers from a qualitative research perspective.

Purpose of the Study

Based on the research background stated above, this study conducts a needs analysis of the competencies of personal trainers in the fitness club industry. Specifically, it aims to achieve the following objectives:

1. To explore the present status of personal trainers.
2. To explore the competencies required by personal trainers.
3. To explore the ways and directions the fitness club industry seeks to cultivate the competencies of personal trainers.

Literature Review

Definition of Personal Trainer

A personal trainer is defined as an instructor who provides professional directions in a one-on-one exercise program (Jiang, 2005). Also, in the capacity as a higher-ranking instructor, a

personal trainer works to establish and promote professionally customized sport programs (Chen, 2005). A personal trainer serves to help a client in the following ways:

- (1) To improve their overall physical fitness through one-on-one instruction in terms of body flexibility, posture, muscular endurance, cardiovascular and lung endurance, and muscular strength.
- (2) To help them achieve a reasonable exercise regime aimed at lowering body fat, achieving body sculpting and strengthening muscles in pursuit of an ideal weight and body composition.
- (3) To help them maintain a high level of motivation and enthusiasm to exercise throughout the training course.
- (4) To attend to their special health needs, develop individualized course projects and raise exercise effectiveness.
- (5) To ensure that they follow proper and safe techniques and minimize the chance of sports injuries.
- (6) To attain their objective of fitness in an efficient manner.
- (7) To teach them sports knowledge and techniques along with the appropriate concepts and postures.
- (8) To improve their physical and mental health so that they attain a sound spiritual state.
- (9) To enhance their commitment to constant participation in sports.
- (10) To devote more of their energy to sports, together with the trainer as the best training partner, to achieve the optimal health results.

To sum up, a personal trainer who provides professional service in a one-on-one sports program is both a high-ranking instructor and a counselor of physical fitness. Thus, the role of personal trainers is of great significance to members in health and fitness clubs.

Definition of Competency

The term competency has been defined in a number of related studies. Liu (1991) proposed that it entails the possession of the knowledge, skills, attitudes and abilities needed by an individual if they are to successfully engage in a given profession. Butler (1996) considered competencies as the knowledge, skills and values required of a person to complete every single job in an individual or professional career. Jarvis (1983) emphasized that competency encompasses three essential components: professional knowledge, professional skills and professional attitudes. Chisholm and Ely (1976) stated that competency should contain the three factors of knowledge, skills and attitudes, all of which interact with each other.

Accordingly, “competency” is closely related to a person's profession, referring to the skills and qualities required by an individual to fulfill their capacity as a professional worker, which can be classified into three aspects, as follows:

- (1) Cognition: theory and knowledge application ability, case and peculiarity analysis ability, sports prescription ability, course design ability, business administration and marketing ability.
- (2) Emotion: personal qualities, image and attitude, public relationships, pressure management, communicative ability, EQ, stimulation ability, crisis management and response ability.
- (3) Skills: practical operation ability, physical fitness evaluation and measurement ability, equipment safety management ability, injury protection ability, and CPR.

The competencies that a personal trainer is required to possess involve not only the three aspects stated above, but also abilities related to professional characteristics and contents. These enable a personal trainer to give the safest and most appropriate instruction to a client.

Competency Possessed by Personal Trainers

Ke and Yang (2002) indicated that the competency of an athletic instructor consists of six major factors, including administrative management, professional knowledge, instruction operation, work attitude, paperwork and interpersonal relationships. Stiff (1993) proposed in his paper *The Personal Trainer* that the competency of an athletic trainer must go along with the following requirements: 1. Being highly professional; 2. Being properly dressed; 3. Setting self-goals; 4. Able to stimulate and motivate members; 5. Being skillful in communication; 6. Aware of volume of training; 7. Thinking from the perspective of clients; 8. Qualified in CPR and basic first aid; 9. Able to perform computer word processing work; 10. Able to manage interpersonal relationships; 11. Possessing marketing knowledge; 12. Being concerned about members; 13. Keeping a training diary; 14. Knowing individual differences, and 15. Able to resolve conflicts. Accordingly, the competencies of a personal trainer encompass not only professional sports knowledge, but also professional abilities related to the specific characteristics and content of the profession.

Personal Training Program Innovation

A personal training program is executed using the following four procedures:

(1) Defining the clients:

In this procedure, personal trainers work primarily to define the abilities of the clients with a full knowledge of their personal data, including their identity, gender, age, income and

educational background. They should also be able to identify old and new customers, their consumption patterns, their needs and objectives.

(2) Classifying the clients:

Based on the personal data, personal trainers must have the clients classified in terms of membership record, personal attributes, preferences, and contributions to provide various kinds of services.

(3) Interacting with the clients:

Following the definition and classification of the clients, personal trainers are required to use the Internet and information technology to establish an online platform for interactions with the clients. For instance, a 24-hour interactive system or hotline service is available online to enhance the communication and cooperation between personal trainers and their clients. In this way, the clients are more likely to maintain their loyalty, and the training program will have greater effectiveness.

(4) Personalized service:

One of the key marketing points for a one-on-one training program lies in the understanding of a client's past, present and future, so as to provide more personalized services. Ideally speaking, a one-on-one training program can be promoted or implemented with various treatments, products and services designed by personal trainers for various types of clients. It can be further customized with the specific, individual needs of the clients taken into consideration. For instance, a program with a combination of various products and services can be established to suit a specific membership status, way of payment and client preferences.

Research Methodology

This study was designed as a form of qualitative research with its researcher as the primary research instrument. Hence, it was of great significance that the researcher be well qualified to effectively represent and transmit the research results and information. This study was conducted with an in-depth interview approach, in which the interviewees were encouraged to engage in a free discussion of the issues in the hope that the collected data could cover both expected and unexpected information. With five years of work experience holding several positions in the bodybuilding profession, the researcher proposed research directions and contents according to personal experience and a review of the literature, and proceeded to conduct a face-to-face interviews with five chief administrators. The data was then compiled and analyzed to explore the competencies required by personal trainers.

Interview Results and Analysis

The data collected from the interview are discussed, as follows:

How significant are personal trainers in a fitness club?

The one-on-one personal training programs bring profitability to a fitness club. In the past, membership fees and monthly cleaning fees constituted the major sources of revenue for a fitness club. Nowadays, personal trainers serve to motivate members to increase their frequency of consumption. The rates for a one-on-one fitness training program in Taiwan are: US\$330 for six sessions, US\$782 for 16 sessions, and US\$1,472 for 32 sessions. The value produced by a personal trainer is estimated at around US\$2,600 per month. With operating expenses and reward bonuses deducted, the company is expected to gain as much as 40% in profits, or more than one-third of the total associated revenue. Accordingly, the role of personal trainers is of great significance to a fitness club.

What kind of competencies are required in personal trainers?

A personal trainer engages in a wide range of work and adopts various roles, such as a teacher, trainer, counselor, supervisor, supporter, nutritionist, bodybuilding evaluator and consultant, life management advisor, weight controller, personal life consultant, and a physical fitness advocate. Therefore, a one-on-one personal training program costs between US\$50-60 per hour. Personal trainers who work to produce the optimal profitability and professional image of a fitness club are required to possess a range of competencies that cover professional knowledge, professional service, marketing and group performance.

What should be strengthened with regard to the related competencies?

One of the managers who was interviewed recommended that the following competencies should be strengthened: (1)Teaching: teaching quality/member assessment, instruction and interaction, course innovation, course design and assignment, and bodybuilding effectiveness; (2)Work performance: course completion, course sales promotion, cultivating new members, marketing skills and communication, and group performance; (3)Services: administration, club image promotion, interpersonal relationships, attending relevant activities, and providing clients with relevant information. Accordingly, personal trainers must work to strengthen the aforementioned components of competency in line with the development of the market and changes in the athletic environment. Compared with the 1990s, the role of personal trainers in a fitness club today is a kind of service innovation that helps the company produce the optimal profitability, and thus has become a top benchmark for business performance.

What kind of personal trainers do you expect?

A sustainable fitness club adheres to the principle of providing innovative services of high quality to satisfy the needs of its clients. Therefore, a personal trainer must be able to

establish a good image of the company and enhance their job performance when providing professional services. Accordingly, in addition to the competencies stated above, personal trainers are expected to strengthen their personal qualities and work attitudes through education and training programs. Meanwhile, with an ideal of promoting internal talents to strengthen their business culture, companies like to choose individuals from their trainers to advance to the management level.

Conclusions and Recommendation

Conclusions

According to the literature review and results of the interviews, this study has managed to shed some light on the appropriate competencies that are required by personal trainers.

In their capacity as a higher-ranking athletic instructor, a personal trainer must possess a variety of professional abilities in four categories: theory and practice, course design, management and marketing, and facility safety maintenance and healthcare, and these are described in more detail below:

(1) Ability in theory and practice

This ability involves basic theoretical knowledge, language proficiency and physical and mental education. A personal trainer is required to respond to numerous questions and ideas raised by members from all walks of life. Therefore, personal trainers must possess a wide range of theoretical knowledge they can articulate clearly when a question arises or problem occurs. They should always pursue new knowledge to expand their expertise. In practice, personal trainers should also maintain their physical strengths to do demonstrations, operate sports equipment, and give bodybuilding instructions, as well as be able to evaluate health and physical fitness, and administer all kinds of fitness tests. They are expected to personally explain, operate

and test every piece of sports equipment during a pre-training assessment. The, based on this assessment, they have to prescribe an optimal exercise program so that a client can improve their physical condition or achieve their bodybuilding objectives.

(2) Ability in course planning and design

This ability encompasses sport course planning, making recommendations, case analysis, and special cases. Personal trainers must be able to plan for short, medium and long term programs characterized by diversity, professionalism, individuality and entertainment, and which are adjustable according to the specific conditions of the members.

(3) Ability in management and marketing

This ability concerns business management, communication, crises management, emotional management, market climate analysis and the 4P marketing mix. Personal trainers need to work through the general climate and development of the market to raise their competitiveness. They should employ the 4P marketing mix to promote their professional services and propose sports programs full of surprises and challenges that stimulate member participation. Meanwhile, they should be aware of any potential risks and work out countermeasures in order to provide comfortable services. In this way, personal trainers will be recognized for their competence and service, while club members will be convinced of experiencing a post-program improvement in their health.

(4) Ability in facility safety maintenance and healthcare

This ability covers facility management, safety operation procedures, injury precaution, prevention and protection, and CPI operation. Personal trainers should make every preparation for an accident or emergency to guarantee a carefree training program. In addition, they should help members to strengthen their own abilities to prevent injuries. In the event of any injury, they

must be able to follow a comprehensive set of safety procedures to achieve efficient and effective management of the situation.

Recommendation

With a growing awareness of health among the people in Taiwan, the demand for personalized and specialized sports has become increasingly strong. An individual can seek to achieve a bodybuilding objective more effectively through a personalized or specialized training program designed by a personal trainer, who is required to possess four major professional abilities: in theory and application, course design, management and marketing, and facility safety maintenance and healthcare. To raise their professionalism and competitiveness, personal trainers should be trained constantly and accredited by international certification institutions. For instance, the Aerobics and Fitness Association of America administers tests for the certification of eight kinds of professional abilities, including (1) Primary Aerobic Instructor Certification, (2) Kick Boxing Instructor Certification, (3) Step Certification, (4) Personal Trainer Certification, (5) Advanced Personal Trainer Certification, (6) Emergency Response Certification, (7) AFAA Fitness Practitioner TM, and (8) Yoga Certification. A personal trainer who is better qualified and holds such certificates plays a crucial role in service innovations in the fitness market.

With reference to the results of this research, a personal trainer education or certification institution may develop their future programs or establish better evaluation criteria. The top managers of the fitness clubs may also use these results to select or evaluate their personal trainers. Those who are interested in entering the personal trainer profession may use this work to better prepare themselves to realize their career goal. Finally, practicing personal trainers may use these results to review and enhance their own competencies to raise their competitiveness.

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